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Assessment Manager

# Site Based Management Plan

## Low Emission Steel Mill, Wellcamp

CLIENT: GM STEEL PTY LTD

**PROJECT NO.** J002248  
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**VERSION** 5

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## Document Control

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# 1 Overview

## 1.1 Background

This Site Based Management Plan (SBMP) provides an environmental management framework for GM Steel Pty Ltd’s proposed Low Emission Steel (LES) mill located on Toowoomba Cecil Plains Road within the Wellcamp Business Park. The LES mill is proposed to be located on a portion of a land parcel formally described as Lot 10 SP296105 (hereafter 'the site') (Figure 1). The Wellcamp Business Park is located within the Toowoomba Regional Council (TRC) Local Government Area (LGA).

## 1.2 Scope

The scope and application of this SBMP is provided in Table 1.

**Table 1 Scope and application of this SBMP**

Question	Answer
Who?	This SBMP applies to all personnel (staff, inspectors, sub-contractors, and site visitors) at the site under the control of GM Steel Pty Ltd (hereafter ‘GM Steel’).
What?	This SBMP applies to all environmental aspects of operational and maintenance activities at the site.
When?	This SBMP applies during the operations phase of the site.
Where?	This SBMP applies to the proposed LES mill located on a portion of a land parcel formally described as Lot 10 SP296105 on Toowoomba Cecil Plains Road, Wellcamp.
Why?	The purpose of this SBMP is to minimise the risk of environmental harm and to satisfy legal and other obligations for environmental protection and general environmental duty.

## 1.3 SBMP Objectives

The objectives of this SBMP are to:

- Describe the site and proposed operations.
- Provide site-specific control measures to minimise the risk of adverse environmental impact during operational activities.
- Define roles, responsibilities and timing for the implementation of environmental control measures.
- Provide mechanisms for incident management and monitoring, review and continual improvement of environmental performance at the site.

**Figure 1 Site Locality**

## 2 Description of Operations and Maintenance

An overview of the site's proposed operations is provided at Table 2. The proposed development plans and process flow diagrams for the LES Mill and Water Treatment Plant are provided at Appendix A.

**Table 2 Proposed Site Operations**

Aspect of Operations	Description
Facility Operator	GM Steel Pty Ltd
Registered Suitable Operator (RSO)	RSO100858177
Site	A portion of Lot 10 SP296105
ERAs	<p>The following ERAs will be undertaken at the proposed development:</p> <ul style="list-style-type: none"> <li>• ERA 19 – Metal forming – hot forming a total of 10,000t or more of metal in a year.</li> <li>• ERA 29 (1)(d) – Metal foundry operation – producing, in a year, more than 10,000t of ferrous metal castings.</li> <li>• ERA 62 (1)(a) – Resource recovery and transfer facility operation – operating a facility for receiving and sorting, dismantling, baling or temporarily storing scrap metal, non-putrescible waste or green waste only.</li> </ul>
Hours of Operation	<p>The site is proposed to operate 24 hours, 7 days per week across three (3) shift periods:</p> <ul style="list-style-type: none"> <li>• 8:00am to 5:00pm (including office/administration personnel).</li> <li>• 4:00pm to 12:00am.</li> <li>• 12:00am to 8:00am.</li> </ul>
Staffing	The site is expected to operate with a total of 193 employees working across the three (3) shift periods. The maximum number of staff onsite at any one time is expected to be 122 (during shift changeover overlap).
Traffic	<p>The following traffic movements are expected to be generated at the site (HIG, 2025):</p> <ul style="list-style-type: none"> <li>• 22 heavy vehicle movements (in and out) per hour or 220 (in and out) per day on a peak haulage day. On an average day of operation, 15 heavy vehicles per hour or 147 per day are expected.</li> <li>• Light vehicle access at the site will be restricted to employee vehicles, with an expected 384 vehicles per day (inbound and outbound) or 34 vehicles per hour (inbound and outbound).</li> </ul>
Annual Throughput	Approximately 380,000 tonnes of scrap metal will be received at the site per year. The proposed LES mill will produce a maximum of 350,000 tonnes of steel products per annum.
Process	<p><b>LES MILL PROCESS OVERVIEW</b></p> <p>The proposed LES mill will operate as follows. A Process Schematic is provided at Appendix A.</p> <ul style="list-style-type: none"> <li>• Ferrous scrap (scrap steel and iron), which will be required to undergo quality screening by the supplier to ensure the scrap meets the required minimum quality standard and is free of feedstock impurities ((i.e. non-ferrous materials, including but not limited to plastics, foams, upholstery, hydrocarbons, metals (excluding steel and iron) will be delivered to the site on trucks. Approximately 380,000 tonnes of scrap metal will be received at the site per year. Approximately 7000 tonnes of scrap metal would be</li> </ul>

Aspect of Operations	Description
	<p>stored on-site at any one time and would be stored for no longer than one (1) week prior to being processed.</p> <ul style="list-style-type: none"> <li>• Proposed Danieli technology will be used to sort the received scrap steel, based on quality (sorting the steel into HMS (heavy melting steel) and shred), into batches for processing, which will then be fed into the Electric Arc Furnace (EAF). No other processing of the scrap steel (e.g., cutting) will be undertaken prior to being directed through the EAF.</li> <li>• The EAF will then be used to melt the scrap steel, and any impurities will be removed. The EAF process will require the following inputs: <ul style="list-style-type: none"> <li>• 600 ML of water per annum. Process water will be continuously recycled back through the plant via a Reverse Osmosis (RO) unit which will treat the process water to ensure it is suitable for reuse onsite.</li> <li>• 10,000 tonnes of lime/dolomite per annum. This is used as a fluxing agent to remove impurities in the melted material, including phosphorus, sulphur, silica, and to a lesser extent, manganese. This generates slag, which will be stored within the designated covered slag storage bay shown at Appendix A.</li> <li>• 7000 tonnes of ferro alloys per annum. This is added to the EAF process to physically introduce or “carry” the element into the melted material to improve the final products’ strength, ductility, etc.</li> <li>• 4550 tonnes of pulverised coal per annum is used in the EAF to assist in the formation of the steel. The carbon in coal is an essential element used in the chemical reaction to enhance the quality of steel produced. Pulverised coal will be delivered to site in B-doubles and injected directly into two (2) silos within the main manufacturing facility (at the southern end of the Melt Shop Plant (Building ID 03 – DWG No. DA 01 – v4 23/12/2025). The pulverised coal will be injected from the silos directly into the EAF. Any by product from the use of coal in the EAF is captured in the slag.</li> </ul> </li> <li>• The melted material will then be directed to a caster to form a continuous strip of semi-molten metal. Electric induction heaters will be utilised to ensure the steel is kept at temperature to ensure it is “hot” for the rolling and forming process.</li> <li>• The hot steel will then be rolled and cut into final shapes in preparation for quality checking, packing and export.</li> <li>• The manufactured long steel products will include reinforced bars, bar coils, wired rod, and light sections.</li> <li>• The final products, packed into containers, will be loaded onto trucks and transported offsite to customers. Note – there will be no direct sale of products from the site.</li> </ul> <p><b>WATER TREATMENT PLANT OVERVIEW</b></p> <p>Water treatment is an integral part of the LES mill operation. The facility will include a Water Treatment Plant that is described below. A process flow diagram for the Water Treatment Plant is provided at Appendix A.</p> <ul style="list-style-type: none"> <li>• The Water Treatment Plant will maintain the quality and efficiency of the manufacturing process. This facility ensures the provision of high-quality water necessary for cooling, descaling, and other essential operations.</li> <li>• Water used in the plant will include raw (bore) water, wastewater recycled from the milling process and stormwater from the scrap steel storage area.</li> </ul>

Aspect of Operations	Description
	<p>Water used in the LES mill will first undergo treatment via Reverse Osmosis (RO) before it enters the plant. Influent quality and properties will vary based on the source of water to the RO plant.</p> <ul style="list-style-type: none"> <li>• Treated cooling water is crucial for preventing scale formation, corrosion, and biofouling in cooling systems, thereby ensuring effective heat exchange and protecting critical equipment. High-pressure water jets use treated water for descaling hot steel billets, enhancing the surface quality of the rebar and preventing defects. Additionally, process water treated for optimal quality is vital for quenching and cleaning, impacting the mechanical properties and surface finish of the rebar. The water treatment processes include filtration to remove suspended solids, chemical treatment to control pH and prevent corrosion and scaling, and the use of cooling towers and heat exchangers to manage water temperature. Clarification and settling processes further ensure the removal of contaminants, supporting the overall efficiency and quality of the rebar production.</li> <li>• Wastes from the Water Treatment Plant include:             <ul style="list-style-type: none"> <li>• Liquid wastes (brine, cooling water blowdown and clarifier effluent) will vary based on the part of the Water Treatment Plant that it is generated from. Liquid wastes from the Water Treatment Plant will be discharged as Trade Waste to the Wellcamp Business Park’s existing STP. Skimmed oil that is removed by the Water Treatment Plant will be drummed and removed as Regulated Waste.</li> <li>• Dried filter cake from the Water Treatment Plant will be removed from site by a Regulated Waste contractor.</li> </ul> </li> <li>• The Water Treatment Plant will not discharge to the environment or release to land or waters. The various elements of the Water Treatment Plant will be located indoors with spill controls such as bunding and be routinely monitored and maintained to detect and prevent leakage.</li> </ul> <p>The Water Treatment Plant for Steel Mill Rebar Production will be equipped with advanced mechanical equipment designed to ensure the highest quality of water for various stages of the steelmaking process. Key components include:</p> <ul style="list-style-type: none"> <li>• Reverse Osmosis treatment package</li> <li>• Horizontal Centrifugal Pumping Stations</li> <li>• Cooling Tower</li> <li>• Plate and Frame Heat Exchanger</li> <li>• Emergency tank with Electromagnetic Pump</li> <li>• Storage tank</li> <li>• Pressure Filters</li> <li>• Scale pit</li> <li>• Longitudinal Clarifier</li> <li>• Ancillaries such as: Grab Bucket, Hoist, Oil Skimmer, Sludge Thickener, Blowers, Softener Plant, Dewatering System Package</li> <li>• Piping, Fittings and Valves</li> <li>• Advanced monitoring and control systems with sensors and probes continuously track water quality parameters, while automated control panels optimize the operation of all mechanical equipment, ensuring efficient and reliable water treatment.</li> </ul>

Aspect of Operations	Description
	<p><b>FUME TREATMENT PLANT OVERVIEW</b></p> <p>Air emissions from the EAF will be managed as follows:</p> <ul style="list-style-type: none"> <li>• Primary emissions from the EAF will be directed through a water-cooled duct into a settling chamber, where light scrap, coarse dust, and slag are collected. Fumes from the settling chamber will then undergo further cooling via another water-cooled duct.</li> <li>• Accumulated heavier particles (e.g., slag) from the settling chamber will be removed using a small front-end loader.</li> <li>• Secondary emissions from the EAF (generated during the operation of the ladle furnace) will be captured via a canopy hood and tapping hood.</li> <li>• Captured primary and secondary emissions will be combined at a mixing point, where inert reactant materials are injected to control dioxins through an adsorption process. Fumes will then pass through an axial cyclone, which will extract hot particles to prevent damage to the downstream bag filters. Fumes will then be filtered using filter bag technology and directed to an exhaust stack with assistance of draft fans.</li> </ul> <p><b>STORMWATER TREATMENT SYSTEM OVERVIEW</b></p> <ul style="list-style-type: none"> <li>• The northern stormwater catchment shall include the following treatment train: HumeGard Gross Pollutant Trap (GPT), vegetated swales and a bioretention basin.</li> <li>• The southern stormwater catchment treatment train shall include a HumeGard GPT that will be connected to the existing Wellcamp Business Park Stormwater Network.</li> <li>• The scrap steel storage area will include an impervious pad which will drain to a lined retention pond. The pad will be within a Controlled Drainage Area (CDA) to exclude external catchments and direct only stormwater from the pad and stockpile to the lined retention pond. Captured stormwater in the lined retention pond be reused in the plant after RO treatment in the Water Treatment Plant. If the lined retention pond overtopped, it would drain as per the southern stormwater catchment. A high-level alarm and seepage detection system would be installed at the lined retention pond.</li> </ul>
<p>Key Infrastructure, Plant and Equipment</p>	<p>The following key infrastructure/use areas will be required for the proposed development:</p> <ul style="list-style-type: none"> <li>• Processing locations comprising enclosed Meltshop, Rolling Mill, and Finishing Area. <ul style="list-style-type: none"> <li>• Meltshop – EAF, ladle furnace, ladle furnace dryers &amp; preheaters, tundish drying &amp; preheating, steam exhaust fan, casting floor, CCM hydraulic shear, front end loader (slag).</li> <li>• Rolling Mill – induction furnace, rolling mill stands, rolling mill shears, quenching box, cut to length area bars, cooling bed bars, bunding station (tying machines), collecting station, shear BGV entry, finishing blocks, water cooling line, laying head, cooling conveyor, coil collecting station, coil compactor, unloading conveyor, dividing shear area, spooler area, typical hydraulic room.</li> </ul> </li> <li>• Five (5) forklifts.</li> </ul>

Aspect of Operations	Description
	<ul style="list-style-type: none"> <li>• Slag shall be stored in a covered storage bay that will include the following to exclude rainfall and stormwater: roof, partial walls, concrete bunded slab with sump.</li> <li>• Scrap steel shall be stockpiled outdoors in a storage area that is impervious and within a Controlled Drainage Area (CDA) that drains to a lined retention pond to capture water for treatment and reuse in the mill. The lined retention pond would have a high-level alarm and seepage detection system.</li> <li>• High voltage sub-station.</li> <li>• Fume treatment plant and air separation plant.</li> <li>• Water treatment plant (for treating raw water, wastewater, stormwater from scrap steel storage CDA, process water and cooling water).</li> <li>• Administration, amenities, and general warehouse/maintenance shop.</li> <li>• Carparking.</li> </ul>
Chemical Storage	<p>The following chemical storage is proposed for the site in aboveground tanks within the designated outdoor storage areas shown at Appendix A. A chemical storage summary table is provided at Appendix A:</p> <ul style="list-style-type: none"> <li>• 1 x 33,000L tank for nitrogen gas.</li> <li>• 1 x 10,000L tank for argon gas.</li> <li>• 1 x 75,000L tank for oxygen gas.</li> <li>• 1 x 33000L tank for liquefied natural gas (LNG).</li> <li>• 1 x 5000L tank for diesel.</li> </ul>
Waste Streams	<p>A detailed Waste Management Plan has been prepared for the facility. A summary of key waste streams is below.</p> <ul style="list-style-type: none"> <li>• General and recyclable wastes generated from staff offices or amenities, general workshop activities and the plant will be stored in bins for segregated wastes and transported offsite as required for disposal or recycling.</li> <li>• Approximately 45,000 tonnes of slag will be generated at the site per annum. Slag shall be stored in a covered storage bay that will include the following to exclude rainfall and stormwater: roof, partial walls, concrete bunded slab with sump. Slag shall be transported offsite to third parties for reuse in accordance with End of Waste (EOW) Code EOWC010002626. Initially, the slag is likely to be supplied to the adjacent Wellcamp Quarry.</li> <li>• Approximately 380,000 tonnes of scrap metal will be received at the site per year for processing in the LES mill. It shall be free of Feedstock Impurities (i.e. non-ferrous materials, including but not limited to plastics, foams, upholstery, hydrocarbons, metals (excluding steel and iron). Scrap steel shall be stockpiled outdoors on an impervious pad which will drain to a lined retention pond. The pad will be within a Controlled Drainage Area (CDA) to exclude external catchments and direct only stormwater from the pad and stockpile to the lined retention pond. Captured stormwater in the lined retention pond be reused in the plant after RO treatment in the Water Treatment Plant. The lined retention pond would have a high-level alarm and seepage detection system.</li> <li>• Sewage from the site will be directed to and managed via the Wellcamp Business Park’s existing STP infrastructure.</li> </ul>

Aspect of Operations	Description
	<ul style="list-style-type: none"> <li>• Liquid wastes (brine, cooling water blowdown and clarifier effluent) from the Water Treatment Plant will be discharged as Trade Waste to the Wellcamp Business Park’s existing STP.</li> <li>• Skimmed oil that is removed by the Water Treatment Plant and oily wastes from the plant will be drummed, stored with secondary containment and removed as Regulated Waste.</li> <li>• Solids wastes contaminated by oil or other chemicals shall be drummed, stored indoors and removed as regulated waste.</li> <li>• Dried filter cake (654 t/year) from the Water Treatment Plant will be stored indoors in a skip and removed from site by a Regulated Waste contractor.</li> <li>• Approximately 7000 tonnes of EAF dust will be generated and captured within the bag filters and axial cyclone at the site per annum. This dust will be gathered by chain conveyors and transferred to a storage silo prior to being discharged through a screw conveyor into a truck for transportation offsite.</li> <li>• Any by product from the use of coal in the EAF is captured in the slag.</li> </ul>

## 2.1 Site Maintenance

To ensure optimum performance of critical equipment in mitigating the environmental impacts of the site's operations, routine inspection and maintenance activities shall be scheduled and implemented.

Maintenance programs and schedules shall be developed for the site in accordance with legislative requirements and manufacturer's specifications. The purpose of site maintenance is to minimise the risk of equipment failure that could result in injury to people, impacts on site operations and service delivery and/or adverse environmental impacts. Maintenance records shall be retained as per Section 11.

## 3 Environmental Values, Potential Impacts and Mitigation Measures

### 3.1 Environmental Values

The relevant environmental values of the site and local area with regards to the site's proposed operations are described in Table 3.

**Table 3 Environmental values**

Environmental value	Description
Surface water	<p>The site is located within the Upper Oakey catchment of the Condamine River Basin. The site drains to the east towards an unnamed drainage feature (stream order 1) located approximately 160 m east of the site. The unnamed drainage feature flows to the north where it enters Dry Creek. Dry Creek flows to the west to Westbrook Creek.</p> <p>The site survey confirmed that there are no watercourses at the site.</p>
Groundwater	<p>The bore logs for registered groundwater bores near the site show that groundwater is sub-artesian and is associated with basalt and coal aquifers of the Main Range Volcanics.</p> <p>The shallowest aquifer recorded in the area (RN42230959) was 24.3 m below ground level (or approximately 493.7 m AHD) in the Main Range Volcanics.</p>
Soil	<p>Soil mapping (1:50,000 scale) provided in QLD Globe shows that the site is comprised of the following soil types:</p> <ul style="list-style-type: none"> <li>• Friable non-cracking clay or clay loam soils (Dermosols, Ferrosols).</li> <li>• Cracking clay soils (Vertosols).</li> </ul>
Amenity (air, noise, and light)	<p>Ambient air quality, light and noise levels of the local area are expected to reflect the influence of public roads (including Toowoomba Cecil Plains Road and the Toowoomba Bypass (Gore Highway)), Toowoomba Grain Storage &amp; Handling, and other businesses in the Wellcamp Business Park (particularly Wagners Wellcamp Quarry for which the site is mapped within the Separation Area under the Extractive Resources Overlay of the Toowoomba Regional Planning Scheme (TRPS) 2012 (v28)). Rural residential and agricultural land uses are the dominant land uses in the broader landscape to the north, east, and south of the site.</p> <p>The closest noise and air quality sensitive receptors are shown at Figure 2 below.</p>

### 3.2 Potential Impacts and Mitigation Measures

Potential impacts on environmental values and key mitigation measures are outlined in Table 4 below. Reference should be made to the Environmental Control Plans (ECPs) at Section 4.3 for full details of mitigation measures.

## Figure 2 Sensitive Receptors

**Table 4 Potential impacts and mitigation measures**

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
Land	Leaks/spills of liquid contaminants during minor maintenance of plant and equipment or from diesel or other chemical storages impacts land.	Unlikely	Insignificant	Low	<ul style="list-style-type: none"> <li>• Chemical storages are mainly gases which don't present a contamination risk to soil or waters. LNG is liquid but is highly volatile and in the event of a leak would volatilise under ambient conditions and not present a contamination risk to soil or waters.</li> <li>• The 5000L diesel AST shall be self-bunded.</li> <li>• Plant and equipment shall be maintained in accordance with the manufacturer's specifications to reduce the risk of equipment failures and spills.</li> <li>• Spill kits shall be maintained and located in strategic locations (i.e., proximate to the diesel storage).</li> <li>• The site will consist of the following proposed treatment train:               <ul style="list-style-type: none"> <li>• Vegetated open channels (swales) designed to intercept and convey surface stormwater runoff, promote infiltration, and interception of sediment by the vegetation.</li> <li>• A bio-retention basin to filter pollutants contained within stormwater through a vegetated filter media. Filtered stormwater shall be collected via drainage pipes beneath the filter media and delivered to the stormwater drainage system.</li> <li>• Gross Pollutant Traps (HumeGard system) shall be installed in the stormwater network prior to the bioretention basin and swales to remove gross pollutants and coarse</li> </ul> </li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
					<p>sediments <math>\geq 150</math> microns from stormwater runoff.</p> <ul style="list-style-type: none"> <li>The scrap steel storage area will have an impervious CDA to exclude external catchments and direct runoff from the stockpile to a lined retention pond for treatment and reuse. The lined retention pond would have a high-level alarm and seepage detection system.</li> <li>Liquid waste containers shall be stored indoors with secondary containment.</li> <li>Spills and leaks of hydrocarbons or chemicals at the site are not anticipated to present a significant soil contamination risk.</li> </ul>
	<p>Rainfall/stormwater contact with scrap steel stored outdoors causes a release to land.</p> <p>Rainfall/stormwater contact with slag causes a release to land.</p> <p>Rainfall/stormwater contact with pulverised coal causes leaching into soil.</p>	Unlikely	Insignificant	Low	<ul style="list-style-type: none"> <li>The scrap steel storage area will have an impervious CDA to exclude external catchments and direct runoff from the stockpile to a lined retention pond. The water captured in the lined retention pond will be directed to the Water Treatment Plant for use in the LES mill. The lined retention pond would have a high-level alarm and seepage detection system.</li> <li>Slag will be stored in a covered storage bay. It will not be exposed to rainfall or stormwater and will not present a risk to land or water quality.</li> <li>Pulverised coal will be stored in silos within the main manufacturing facility. The pulverised coal will not be exposed to rainfall or stormwater and therefore will not leach into soils.</li> </ul>
	Poor management of solid or liquid wastes causes	Unlikely	Insignificant	Low	<ul style="list-style-type: none"> <li>General and recyclable wastes generated from staff areas and general workshop activities shall</li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
	environmental contamination due to a release to land.				<p>be stored in segregated waste bins and removed regularly from the site.</p> <ul style="list-style-type: none"> <li>• Slag will be stored in a covered slag storage bay. It shall be managed and transported offsite in accordance with EOW Code EOWC010002626.</li> <li>• EAF dust shall be gathered via chain conveyors and transferred to a storage silo prior to being discharged through a screw conveyor into a truck for transportation offsite.</li> <li>• The scrap steel storage area will have an impervious CDA to exclude external catchments and direct runoff from the stockpile to a lined retention pond for treatment and reuse. The lined retention pond would have a high-level alarm and seepage detection system.</li> <li>• Ferrous scrap received at the site shall be free of feedstock impurities and shall be stored for no longer than seven (7) days prior to being reprocessed.</li> <li>• Liquid waste containers shall be stored indoors with secondary containment.</li> <li>• Dried filter cake shall be stored in a skip inside the Water Treatment Plant building.</li> <li>• The Water Treatment Plant will not discharge to the environment or release to land or waters. The various elements of the Water Treatment Plant will be located indoors with spill controls such as bunding and be routinely monitored and maintained to detect and prevent leakage.</li> <li>• The risk of solid or liquid wastes causing environmental contamination is low.</li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
	Contaminated firewater is released from the site during an emergency and adversely impacts soil quality.	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>The SBMP outlines measures that shall be taken to reduce the risk of fire at the site and emergency response measures, including, the management of firewater.</li> <li>The proposed development is not anticipated to present a significant soil contamination risk in the event of a fire.</li> </ul>
Water	Contaminated firewater is released from the site during an emergency and adversely impacts water quality in the Upper Oakey catchment.	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>The SBMP outlines measures that shall be taken to reduce the risk of fire at the site and emergency response measures, including, the management of firewater.</li> <li>The proposed development is not anticipated to present a significant contamination risk to surface water or groundwater in the event of a fire.</li> </ul>
	Air emission deposits impact stormwater quality.	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>Depositional dust monitoring at the site will be conducted.</li> <li>Air emissions from the plant are predicted by ViridAU (2025) to meet the adopted emission criteria which means that there is a low risk of air emissions depositing the local area and impacting stormwater quality.</li> </ul>
	Rainfall/stormwater contact with scrap steel stored outdoors impacts stormwater quality. Rainfall/stormwater contact with slag impacts stormwater quality. Rainfall/stormwater contact with pulverised coal and impacts stormwater quality.	Unlikely	Insignificant	Low	<ul style="list-style-type: none"> <li>The scrap steel storage area will have an impervious CDA to exclude external catchments and direct runoff from the stockpile to a lined retention pond. The water captured in the lined retention pond will be directed to the Water Treatment Plant for use in the LES mill. The lined retention pond would have a high-level alarm and seepage detection system.</li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
	<p>Poor management of solid or liquid wastes causes environmental contamination due to a release to waters.</p>	<p>Unlikely</p>	<p>Insignificant</p>	<p>Low</p>	<ul style="list-style-type: none"> <li>• Slag will be stored in a covered storage bay. It will not be exposed to rainfall or stormwater and will not present a risk to land or water quality.</li> <li>• Pulverised coal will be stored in silos within the main manufacturing facility. The pulverised coal will not impact stormwater quality as it will not be exposed to rainfall or stormwater.</li> </ul> <ul style="list-style-type: none"> <li>• The site drains to the east towards an unnamed drainage feature located approximately 160 m east of the site.</li> <li>• Groundwater is deep (approximately 24.3 m below ground level) and at a low risk of impact.</li> <li>• General and recyclable wastes generated from staff areas and general workshop activities shall be stored in segregated waste bins and removed regularly from the site.</li> <li>• Slag generated at the site shall be stored in a covered storage bay with no contact by rainfall or stormwater. It shall be managed and transported offsite in accordance with EOW Code EOWC010002626.</li> <li>• EAF dust shall be gathered via chain conveyors and transferred to a storage silo prior to being discharged through a screw conveyor into a truck for transportation offsite.</li> <li>• Ferrous scrap received at the site shall be free of feedstock impurities and stored for no longer than seven (7) days prior to being reprocessed.</li> <li>• The scrap steel storage area will have an impervious CDA to exclude external catchments and direct runoff from the stockpile to a lined</li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
					<p>retention pond. The water captured in the lined retention pond will be directed to the Water Treatment Plant for use in the LES mill. The lined retention pond would have a high-level alarm and seepage detection system.</p> <ul style="list-style-type: none"> <li>• Liquid waste containers shall be stored indoors with secondary containment.</li> <li>• Dried filter cake shall be stored in a skip inside the Water Treatment Plant building.</li> <li>• The Water Treatment Plant will not discharge to the environment or release to land or waters. The various elements of the Water Treatment Plant will be located indoors with spill controls such as bunding and be routinely monitored and maintained to detect and prevent leakage.</li> <li>• The storage of wastes at the site is not anticipated to present a significant contamination risk to stormwater, surface waters or groundwater.</li> </ul>
	<p>Leaks/spills of liquid contaminants during minor maintenance of plant and equipment or from diesel or chemical storages impacts waters.</p>	<p>Unlikely</p>	<p>Insignificant</p>	<p>Low</p>	<ul style="list-style-type: none"> <li>• Chemical storages are mainly gases which don't present a contamination risk to soil or waters. LNG is liquid but is highly volatile and in the event of a leak would volatilise under ambient conditions and not present a contamination risk to soil or waters.</li> <li>• The 5000L diesel storage shall be self-bunded.</li> <li>• Plant and equipment shall be maintained in accordance with the manufacturer's specifications to reduce the risk of equipment failures and spills.</li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
					<ul style="list-style-type: none"> <li>• Spill kits shall be maintained and located in strategic locations (i.e., proximate to the diesel storage).</li> <li>• The site will include the following proposed treatment train:                             <ul style="list-style-type: none"> <li>• Vegetated open channels (swales) designed to intercept and convey surface stormwater runoff, promote infiltration, and interception of sediment by the vegetation.</li> <li>• A bio-retention basin to filter pollutants contained within stormwater through a vegetated filter media. Filtered stormwater shall be collected via drainage pipes beneath the filter media and delivered to the stormwater drainage system.</li> <li>• Gross Pollutant Traps (HumeGard system) shall be installed in the stormwater network prior to the bioretention basin and swales to remove gross pollutants and coarse sediments <math>\geq 150</math> microns from stormwater runoff.</li> <li>• The scrap steel storage area will have an impervious CDA to exclude external catchments and direct runoff from the stockpiles to a lined retention pond. The water captured in the lined retention pond will be directed to the Water Treatment Plant for use in the LES mill. The lined retention pond would have a high-level alarm and seepage detection system.</li> </ul> </li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
					<ul style="list-style-type: none"> <li>Spills and leaks of hydrocarbons or other chemicals at the site are not anticipated to present a significant contamination risk to waters.</li> </ul>
Noise, Air and Greenhouse Gases	Noise emissions from the operation of plant and vehicle movements causes nuisance at noise sensitive receptors.	Unlikely	Insignificant	Low	<ul style="list-style-type: none"> <li>The site is located within the Wellcamp Business Park and is zoned as Medium and High Impact Industry.</li> <li>The nearest noise sensitive receptor (residential dwelling) is located approximately 665m north-west of the site.</li> <li>The Noise Impact Assessment prepared by ViridAU (2025) identified the following:               <ul style="list-style-type: none"> <li>Predicted noise levels from the proposed LES mill complied with the Acoustic Quality Objectives (AQO) criteria under the Environmental Protection (Noise) Policy 2019 (EPP Noise) at all identified receptors during the day and evening periods.</li> <li>Predicted exceedances of 1-2 dB of the AQO night-time criteria were identified at three (3) receptors.</li> <li>Noise emissions from the proposed LES mill were unlikely to cause nuisance at nearby sensitive receptors as:                   <ul style="list-style-type: none"> <li>Predicted levels were within acceptable limits when assessed against the background creep criteria during all periods.</li> <li>Predicted levels were at least 12 dB(A) below the measured ambient <math>L_{Aeq}</math> levels, indicating that noise emissions from the</li> </ul> </li> </ul> </li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
					<p>site will be significantly masked by existing environmental sound.</p> <ul style="list-style-type: none"> <li>- The Noise Measurement Manual (DES, 2020) outlines that an exceedance of 1-3 dB(A) is generally just perceptible and is therefore expected to result in no or negligible community reaction.</li> <li>• The SBMP outlines management measures that shall be implemented at the site to reduce noise emissions.</li> <li>• No significant impacts to amenity in relation to noise emissions from the proposed development are anticipated.</li> </ul>
	<p>Air emissions from the operation of plant and equipment causes harm at sensitive receptors.</p>	<p>Unlikely</p>	<p>Insignificant</p>	<p>Low</p>	<ul style="list-style-type: none"> <li>• The Air Quality Impact Assessment prepared by ViridAU (2025) identified the following: <ul style="list-style-type: none"> <li>• The primary source of air emissions at the proposed LES mill will be from the fume treatment plant attached to the EAF where particulate emissions will be managed through the implementation of bag filters and an axial cyclone system.</li> <li>• Other site activities, including the discharge of dust from the storage silos into trucks, are not expected to generate significant levels of airborne particulates.</li> <li>• Predicted incremental and cumulative concentrations for all modelled pollutants during routine and non-routine operations were well below their respective assessment criteria at all identified receptors which</li> </ul> </li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
					<p>demonstrates a low-level impact expected from the proposed development.</p> <ul style="list-style-type: none"> <li>All traffic at the site will be on hardstand surfaces, reducing the risk of fugitive dust emissions from vehicle movements.</li> <li>The SBMP outlines management measures that shall be implemented at the site to minimise air emissions from the proposed operations.</li> <li>Air emissions from the FTP will be monitored.</li> <li>The proposed development is not anticipated to cause air quality impacts at nearby sensitive receptors.</li> </ul>
	<p>GHG emissions are released to the atmosphere as a direct result of the proposed operations.</p>	<p>Likely</p>	<p>Minor</p>	<p>High</p>	<ul style="list-style-type: none"> <li>Direct (scope 1) emission sources for the proposed LES mill were estimated to be 2083 CO<sub>2</sub>-e tonnes/year and include (ViridAU, 2025b):                             <ul style="list-style-type: none"> <li>Natural gas combustion for stationary energy purpose.</li> <li>Diesel fuel combustion for stationary energy purposes.</li> <li>Diesel fuel combustion for transport energy purposes.</li> </ul> </li> <li>Indirect (scope 2) emission sources for the proposed LES mill were estimated to be 124,250 CO<sub>2</sub>-e tonnes/year and include electricity consumption from the grid for facility operations including the EAF (ViridAU, 2025b).</li> <li>The estimated total (scope 1 and scope 2) GHG emissions from the proposed LES mill are therefore 126,333 CO<sub>2</sub>-e tonnes/year, categorising</li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
					<p>the proposal as a medium to high emitter under the GHG Guideline.</p> <ul style="list-style-type: none"> <li>• Scope 3 emission sources for the proposed LES mill were estimated to be 157,507 CO<sub>2</sub>-e tonnes/year and include (ViridAU, 2025b): <ul style="list-style-type: none"> <li>• Upstream diesel fuel consumption.</li> <li>• Upstream electricity consumption.</li> <li>• Upstream raw material – scrap steel.</li> </ul> </li> <li>• GHG mitigation measures shall be outlined in a Greenhouse Gas Emission Abatement Plan.</li> </ul>
	Fugitive coal dust emissions from pulverised coal handling and storage.	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>• Pulverised coal will be delivered to site in B-doubles and injected directly into silos within the main manufacturing facility. The pulverised coal will be injected from the silos directly into the EAF. The pulverised coal won't result in fugitive coal dust emission due to the enclosed injection and storage systems that shall be used.</li> </ul>
Light	Light emissions from the proposed 24-hour operation causes nuisance at nearby sensitive receptors.	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>• Outdoor lighting at the site shall comply with Australian Standard AS4282:2019 <i>Control of the Obtrusive Effects of Outdoor Lighting</i>.</li> <li>• The site is located approximately 451m from the nearest sensitive receptor (Figure 2), which does not have a direct line of sight to the site due to existing topographical conditions.</li> <li>• No impacts in relation to light emissions from the site are anticipated.</li> </ul>
Biodiversity	Clearing of protected vegetation communities (Regional Ecosystems or TECs).	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>• The site does not contain Regional Ecosystems or TECs.</li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
					<ul style="list-style-type: none"> <li>The proposed development will not impact protected vegetation communities.</li> </ul>
	Harm to threatened flora and fauna species and their habitat.	Rare	Unlikely	Low	<ul style="list-style-type: none"> <li>Near threatened flora species <i>Digitaria porrecta</i> (Finger panic grass) was identified as present at the site during the field survey, which shall be managed in accordance with the relevant requirements under the <i>Nature Conservation Act 1992</i>.</li> <li>No additional critically endangered, endangered, or vulnerable flora species which are a matter of state environmental significance were identified at the site.</li> <li>Assessment of the site, and completion of a likelihood of occurrence assessment for listed species, has identified that the site is unlikely to provide suitable habitat for State and Commonwealth listed fauna species (Range Environmental, 2025).</li> </ul>
	Introduction or spread of weeds, pests (rodents) and vectors (mosquitoes).	Unlikely	Minor	Low	<ul style="list-style-type: none"> <li>Ferrous scrap received at the site shall be stored for no longer than seven (7) days prior to being reprocessed.</li> <li>Putrescible wastes from staff areas (e.g., food wastes) shall be stored in covered bins and removed from the site at least weekly.</li> <li>Weeds and pests (rodents, cockroaches, etc.) shall be managed as a part of routine site maintenance.</li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
					<ul style="list-style-type: none"> <li>The lined retention pond that services the scrap steel storage area CDA shall be monitored and managed to prevent pests such as mosquitoes.</li> <li>The proposed development is not anticipated to present a significant risk with regards to the proliferation of weeds, pests (rodents) or vectors (mosquitoes).</li> </ul>
	Harm to the ecological values and functions of waterways or wetlands.	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>The site does not contain or immediately adjoin any waterways or wetlands.</li> <li>The 5000L diesel storage shall be self-bunded.</li> <li>Spill kits shall be maintained and located in strategic locations (i.e., proximate to the diesel storage).</li> <li>The following stormwater controls that shall be implemented at the site:                             <ul style="list-style-type: none"> <li>The northern portion of the site will flow towards Toowoomba-Cecil Plains Road and the southern portion of the site will flow towards the existing Wellcamp Business Park stormwater network (as per the endorsed Wellcamp Business Park &amp; Airport – Stormwater Management Report – Issue 6).</li> <li>The southern portion of the site will be fitted with a Gross Pollutant Trap prior to being discharged to the existing Wellcamp Business Park stormwater network.</li> <li>The remainder of the site will consist of the following proposed treatment train:                                     <ul style="list-style-type: none"> <li>Vegetated open channels (swales) designed to intercept and convey surface stormwater runoff, promote</li> </ul> </li> </ul> </li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
					<p>infiltration, and interception of sediment by the vegetation.</p> <ul style="list-style-type: none"> <li>- A bio-retention basin to filter pollutants contained within stormwater through a vegetated filter media. Filtered stormwater shall be collected via drainage pipes beneath the filter media and delivered to the stormwater drainage system.</li> <li>- Gross Pollutant Traps (HumeGard system) shall be installed in the stormwater network prior to the bioretention basin and swales to remove gross pollutants and coarse sediments <math>\geq 150</math> microns from stormwater runoff.</li> </ul> <ul style="list-style-type: none"> <li>• The scrap steel storage area will have an impervious CDA to exclude external catchments and direct runoff from the stockpile to a lined retention pond. The water captured in the lined retention pond will be directed to the Water Treatment Plant for use in the LES mill. The lined retention pond would have a high-level alarm and seepage detection system.</li> <li>• Slag shall be stored in covered storage bay and won't have contact with rainfall or stormwater</li> <li>• The proposed development will not impact the ecological values or functions of any waterways or wetlands in the Upper Oakey catchment.</li> </ul>

Environmental Value	Potential Source and Impact	Likelihood	Consequence	Risk	Comment
	Adverse impacts to areas of environmental significance, landscape connectivity or protected areas.	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>The site does not include any protected areas that may provide important habitat or landscape connectivity value for local fauna.</li> <li>The proposed development will not impact on landscape ecological values or connectivity.</li> </ul>
	Adverse impacts on PEM (MSES or MNES) at the site.	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>No PEM (MSES or MNES) occur at the site.</li> <li>The facility will not have a significant residual impact on MSES or MNES.</li> </ul>
Visual amenity	The proposed development adversely impacts the visual amenity values of the site and local area.	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>The site is located within an area proposed to form an expansion to the existing Wellcamp Business Park and is zoned as Medium and High Impact Industry.</li> <li>The site is not within the Scenic Amenity or Neighbourhood Character overlays under the TRPS 2012 (v28).</li> <li>The appearance of the proposed development will be consistent with the other uses in the Wellcamp Business Park. No significant impacts to visual amenity are anticipated.</li> </ul>
Cultural heritage	The proposed development adversely impacts the cultural heritage values of the site.	Rare	Insignificant	Low	<ul style="list-style-type: none"> <li>There are no recorded cultural heritage values at the site.</li> <li>No significant impacts to cultural heritage values are anticipated.</li> <li>All works shall be undertaken in accordance with the Cultural Heritage Duty of Care Guidelines.</li> </ul>

## 4 Environmental Management

### 4.1 Management Commitment

GM Steel is committed to providing a high standard of environmental performance, protection and conservation of the natural environment at the site. This will be achieved by practicing good environmental management and the ongoing measurement, evaluation and review of performance to ensure continual improvement.

GM Steel are committed to:

- Complying with all legal and other obligations that apply to the site for environmental protection.
- Providing adequate resources to implement this SBMP and the associated environmental protection and monitoring measures.
- Achieving the environmental goals outlined in the Environmental Control Plans (ECPs) at Section 4.3.
- Monitoring compliance with this SBMP and seeking to continually improve environmental performance at the site.

### 4.2 Environmental Management Responsibilities

#### 4.2.1 General Environmental Duty

All personnel at the site shall comply with their General Environmental Duty under the *Environmental Protection Act 1994* (EP Act). This means a person must not carry out any activity that causes, or is likely to cause environmental harm, unless all reasonably practicable measures to prevent or minimise the harm have been taken.

#### 4.2.2 Duty to Notify of Environmental Harm

All persons have a duty under the EP Act to notify the Department of the Environment, Tourism, Science and Innovation (DETSI) of incidents or emergencies that cause or threaten material or serious environmental harm. This obligation is detailed further at Section 7.

#### 4.2.3 Duty to Restore the Environment

All persons have a duty under the EP Act to take actions as soon as reasonably practicable to rehabilitate or restore the environment as far as reasonably practicable to its condition before the harm was caused. The duty to restore applies if a person has caused or permitted an incident involving contamination to occur that results in unlawful environmental harm.

When deciding the measures required to restore the environment, regard for the following must be had:

- The nature and extent of the environmental harm caused by the contamination.
- The sensitivity of the receiving environment to remedial measures that might be taken in relation to the environmental harm.
- The current state of technical knowledge for remedial measures that might be taken in relation to the environmental harm.
- The likelihood of successful application of the different measures that might be taken in relation to the environmental harm.
- The financial implications of the different measures that might be taken in relation to the environmental harm.

The Duty to Restore the Environment Information Sheet can be downloaded from the [DETSI website](#).

#### 4.2.4 Roles and Responsibilities

All personnel, including sub-contractors and visitors, are responsible for environmental protection during operations and maintenance works at the site. Responsibilities and reporting lines for environmental matters are described in Table 5.

**Table 5 Roles and responsibilities**

Role	Responsibilities	Reports to
General Manager	<ul style="list-style-type: none"> <li>• Ensure operations comply with all relevant regulatory and project requirements.</li> <li>• Monitor changes to legislation which may affect site operations.</li> <li>• Ensure this SBMP is fully implemented, and environmental protection is not secondary to operational requirements.</li> <li>• Provide adequate resources for the implementation of the SBMP.</li> <li>• Ensure that all personnel understand, accept and fully carry out their obligations for environmental protection and that they are adequately trained, instructed and resourced to fulfil their obligations.</li> <li>• Undertake the annual environmental management review and SBMP review.</li> <li>• Seek relevant approvals for any required works or changes to the site conditions outside the limits of the applicable approvals/permits/plans.</li> <li>• Conduct environmental incident investigations as required.</li> <li>• Direct that works be stopped immediately where there is an actual or potential risk of environmental harm.</li> <li>• Comply with General Environmental Duty, Duty to Notify of Environmental Harm, and Duty to Restore the Environment.</li> </ul>	Regulatory authorities
Overall Production Crew Leader, Meltshop Manager, Rolling Mill Plant Manager, Environmental Manager, Maintenance Manager, Quality Manager, and Logistic Manager	<ul style="list-style-type: none"> <li>• Ensure operations comply with all relevant regulatory and project requirements.</li> <li>• Ensure this SBMP is fully implemented, and environmental protection is not secondary to operational requirements.</li> <li>• Ensure that all personnel understand, accept and fully carry out their obligations for environmental protection and that they are adequately trained, instructed and resourced to fulfil their obligations.</li> <li>• Assist with the annual environmental management review and SBMP review as required.</li> <li>• Schedule and execute maintenance of environmental controls.</li> <li>• Assist with environmental incident investigations as required.</li> </ul>	General Manager

Role	Responsibilities	Reports to
	<ul style="list-style-type: none"> <li>• Direct that works be stopped immediately where there is an actual or potential risk of environmental harm and consult with the General Manager.</li> <li>• Comply with General Environmental Duty, Duty to Notify of Environmental Harm, and Duty to Restore the Environment.</li> </ul>	
Plant Operators and other personnel (includes staff, visitors, inspectors, and contractors)	<ul style="list-style-type: none"> <li>• Regard environmental protection as a central theme in their actions.</li> <li>• Conduct operations as per the SBMP to reduce the risk of adverse environmental impacts.</li> <li>• Report any defects in plant or equipment and keep the workplace in a tidy state.</li> <li>• Notify the relevant area manager or General Manager of any unexpected changes to the site's conditions.</li> <li>• Assist with environmental incident investigations as required.</li> <li>• Stop works where there is an actual or potential risk of environmental harm and notify the relevant area manager or General Manager.</li> <li>• Comply with General Environmental Duty, Duty to Notify of Environmental Harm, and Duty to Restore the Environment.</li> </ul>	Relevant area manager or General Manager

### 4.3 Environmental Control Plans

Environmental control plans (ECPs) have been developed to document site-specific environmental management measures to address the key environmental management considerations for the site. Alternative controls to those outlined in the ECPs may be adopted if the objectives of the relevant ECP can still be met and should be documented in an updated SBMP. The ECPs provide management measures in relation to:

1. Noise, Air and Light.
2. Land and Water.
3. Dangerous Goods and Hazardous Substances.
4. Liquid and Solid Waste.

ECP 1 – Noise, air and light management measures		
Guidelines and Legislative Requirements		
EP Act, EPP Air, EPP Noise, Development Approval and Environmental Authority.		
Performance Goal		
No complaints of nuisance regarding noise, air, or light emissions from the site.		
Management Actions	Responsibility	Frequency
<b>Air Quality</b>		
<p>Emissions from the EAF shall be managed as follows:</p> <ul style="list-style-type: none"> <li>Primary emissions from the EAF shall be directed through a water-cooled duct into a settling chamber, where light scrap, coarse dust, and slag are collected. Fumes from the settling chamber shall then undergo further cooling via another water-cooled duct.</li> <li>Secondary emissions from the EAF (generated during the operation of the ladle furnace) shall be captured via a canopy hood and tapping hood.</li> <li>Captured primary and secondary emissions shall be combined at a mixing point, where inert reactant materials are injected to control dioxins through an adsorption process. Fumes shall then pass through an axial cyclone, which will extract hot particles to prevent damage to the downstream bag filters. Fumes shall then be filtered using filter bag technology and directed to an exhaust stack with assistance of draft fans.</li> <li>Pulverised coal will be delivered to site in B-doubles and injected directly into silos within the main manufacturing facility. The pulverised coal will be injected from the silos directly into the EAF. The pulverised coal won't result in fugitive coal dust emission due to the enclosed injection and storage systems that shall be used.</li> </ul>	General Manager	At all times
<p>The FTP vent stack shall meet the following (as per Table 8 of the ViridAU, 2025 – Air Quality Impact Assessment) (Rev 03, 4 July 2025) and any additional specifications provided by the manufacturer (refer to Appendix B).</p> <ul style="list-style-type: none"> <li>Stack height = 50 m above ground level</li> <li>Stack diameter = 4.8m</li> <li>Exit velocity = 12 m/sec</li> <li>Stack gas temperature = 371 k</li> </ul>	General Manager	During routine operations
<p>Develop and implement a <i>Fume Treatment Plant Operating and Maintenance Manual</i> in accordance with the manufacturer's recommendations.</p>	General Manager	Prior to the commencement of operations
<p>Maintain and operate plant and equipment at the facility within the manufacturer's recommended technical specifications to minimise air emissions.</p>	General Manager	At all times

<b>Noise</b>		
Maintain plant and equipment in accordance with the manufacturer's specifications to minimise noise emissions.	General Manager	At all times
When purchasing new processing equipment, models with low noise emissions shall be preferred.	General Manager	As required
No unnecessary revving or idling of engines on mobile and stationary machines and shut down any equipment not in use.	All persons	At all times
Minimise the drop height of materials when transferring (e.g., loading and unloading vehicles) where practicable.	All persons	At all times
Trafficable surfaces shall be maintained to minimise tyre noise and ensure any grids/manhole covers or similar are secured to prevent noise from rattling and vibrating.	Maintenance Manager	At all times
<b>Lighting</b>		
All external lighting shall comply with Australian Standard <i>AS4282:2019 Control of the Obtrusive Effects of Outdoor Lighting</i> .	General Manager and Maintenance Manager	At all times
All external lighting shall be directed onto the site and in accordance with any requirements of the Toowoomba Wellcamp Airport.	General Manager and Maintenance Manager	At all times
<b>Monitoring</b>		
Monitoring of noise, air, or light emissions at sensitive receptors shall be undertaken upon written request by the administering authority in response to a complaint of nuisance.	General Manager	As required
<b>Corrective Actions</b>		
Complaints and incidents in relation to air, noise, or light emissions from the site shall be investigated by the General Manager to identify necessary corrective actions for implementation.		
<b>Reporting</b>		
Monitoring results shall be provided to the administering authority within 20 business days of a request to conduct nuisance-based monitoring.	General Manager	As required

<b>ECP 2 – Land and water management measures</b>		
<b>Guidelines and Legislative Requirements</b>		
EP Act, EPP Water and Wetland Biodiversity, Stormwater Management Plan, Environmental Authority and Development Approval.		
<b>Performance Goal</b>		
No material or significant environmental harm to soil or water quality.		
<b>Management Actions</b>	<b>Responsibility</b>	<b>Frequency</b>
<b>General Requirements</b>		
Chemical storages at the site shall be managed in accordance with ECP 3 – Dangerous goods and hazardous chemical management measures.	All persons	At all times
Waste streams shall be managed in accordance with ECP 4 – Liquid and solid waste management measures and the Detailed Waste Management Plan.	All persons	At all times
Slag shall be stored inside the covered slag storage area. Any water that accumulates in the sump shall be inspected and pumped out to the Water Treatment Plant or removed from the site as Regulated Waste.	Maintenance Manager	At all times
Pulverised coal will be stored in silos within the main manufacturing facility to prevent contact with rainfall/stormwater. Enclosed direct injection systems will be used to load the pulverised coal and supply the EAF.	All persons	At all times
<b>Stormwater</b>		
The impervious Controlled Drainage Area (CDA) of the scrap steel stockpile area shall be maintained to exclude external catchments and direct all runoff to the lined retention pond.	Maintenance Manager	At all times
Prioritise the treatment and re-use of water in the lined retention pond at all times to reduce the water level as low as reasonably practicable.	Operations Manager	At all times
The stormwater treatment train shall be maintained as required by the stormwater management plan.	Maintenance Manager	As required
<b>Emergency – Firewater</b>		
During operations, undertake all reasonably practicable management measures to prevent a fire (Section 8.1).	All persons	At all times
Minimise water use during a fire as far as safe and practicable to limit wastewater generation.	All persons	During a fire
Contained firewater shall be removed by a regulated waste contractor.	General Manager	During a fire
<b>Monitoring</b>		
Site inspections (monthly and rainfall based) shall be undertaken to identify site maintenance requirements to minimise risks to land and water.	General Manager	Monthly  Prior to and after rainfall exceeding 10 mm in 24 hours

<p>Targeted inspections shall be undertaken of:</p> <ul style="list-style-type: none"> <li>Scrap steel storage area CDA and retention pond to focus on water level and freeboard, liner condition and evidence of pests such as mosquitoes.</li> <li>Sump in the covered slag storage bay shall be inspected to determine if there is accumulated water in the sump requires removal.</li> </ul>	Maintenance Manager	Weekly
A high-level alarm shall be installed, maintained and monitored in the lined retention pond that alerts the mill control room panel.	Operations Manager	At all times
Three (3) seepage monitoring bores or another seepage detection system shall be installed and monitored at the lined retention pond to allow for detection of leakage. The frequency of monitoring shall be determined by the type of system.	General Manager	At all times.
Monitoring of soil or water shall be undertaken as required in accordance with Section 9.2.	General Manager	As required
<b>Corrective Actions</b>		
Incidents in relation to soil and water management at the site shall be investigated by the General Manager to identify necessary corrective actions for implementation.		
<b>Reporting</b>		
If runoff from the site causes or threatens serious or material environmental harm, the incident shall be notified to the DETSI (refer to Section 7.3).	General Manager	As required

ECP 3 – Dangerous goods and hazardous chemical management measures		
<b>Guidelines and Legislative Requirements</b>		
Development Approval, Environmental Authority, AS1940-2017: <i>The Storage and Handling of Flammable and Combustible Liquids</i> and <i>Workplace Health and Safety Queensland's Managing Risks of Hazardous Chemicals in the Workplace – Code of Practice 2021.</i>		
<b>Performance Goal</b>		
No environmental harm caused by the storage, use or handling of dangerous goods or hazardous chemicals at the site.		
Management Actions	Responsibility	Frequency
Spills shall be cleaned up immediately. Personnel shall be trained in spill prevention and spill response/control procedures.	All persons	At all times
Spill kits shall be located in strategic locations onsite (i.e., proximate to the diesel storages). Ensure that spill clean-up kits are stocked and replenished appropriately, and in the correct location for use.	General Manager	At all times
Appropriate fire extinguishers shall be provided onsite for flammable and combustible chemicals.	General Manager	At all times
Any chemical spills that occur shall be removed using 'dry' cleaning methods (e.g., use of absorbent materials, sweeping, etc.). All used absorbent materials shall be managed and disposed of as regulated/hazardous waste.	All persons	At all times
Containers of chemicals and other liquids greater than 15 litres shall be kept within a secondary containment system that is impervious to the materials stored within it and managed to prevent the release of contaminants to waters or land. Secondary containment may be fixed bunding, self-bunded pallets or double skinned containers. Bunds should be large enough to contain the volume of the largest container + 10%.	All persons	At all times
The 5000 L diesel storage shall be self-bunded and maintained in accordance with the manufacturer's specifications to minimise the risk of leaks and spills.	General Manager	At all times
No onsite disposal of chemical wastes shall be permitted.	All persons	At all times
The Safety Data Sheets (SDS) for dangerous goods and hazardous substances shall be kept onsite.	General Manager	At all times
All dangerous goods and/or hazardous substances shall be classified, stored, labelled and used in accordance with the Code of Practice, SDS, manufacturer's requirements and the relevant Australian Standard.	All persons	At all times
Spill kits, drip trays, and any other necessary controls shall be used during minor maintenance works to plant and equipment.	All persons	At all times
Pre-start checks shall be completed on all plant and equipment.	Plant Operators	Daily
Plant and equipment shall be operated and maintained in accordance with the manufacturer's specifications.	All persons	At all times

<b>Monitoring</b>		
Inspect dangerous goods and hazardous chemical storages for maintenance requirements or evidence of spills/leaks.	General Manager	Monthly
<b>Corrective Actions</b>		
Incidents in relation to dangerous goods and hazardous chemicals at the site shall be investigated by the General Manager to identify necessary corrective actions for implementation.		
<b>Reporting</b>		
Spills or leaks that cause or threaten serious or material environmental harm shall be notified to the DETSI (refer to Section 7.3).	General Manager	As required

ECP 4 – Liquid and solid waste management measures		
<b>Guidelines and Legislative Requirements</b>		
EP Act, <i>Waste Reduction and Recycling Act 2011</i> , Development Approval, Environmental Authority and EOW Code EOWC010002626.		
<b>Performance Goals</b>		
<ul style="list-style-type: none"> <li>• Wastes correctly segregated and stored.</li> <li>• No illegal waste disposal or burning of wastes.</li> <li>• All wastes transported by appropriately licensed waste transporters to waste facilities that are licensed to receive the wastes.</li> <li>• All waste tracking documents and receipts retained.</li> </ul>		
Management Actions	Responsibility	Frequency
Waste storage and management requirements will be confirmed at detailed design and then updated as required to reflect site operational requirements.	General Manager	At detailed design and then ongoing for life of plant.
Waste storage areas shall be kept in a clean and hygienic state.	All persons	At all times
The impervious Controlled Drainage Area (CDA) of the scrap steel stockpile area shall be maintained to exclude external catchments and direct all runoff to the lined retention pond for subsequent treatment and reuse.	Maintenance Manager	At all times
Slag shall be stored in a covered slag storage bay that is protected from rainfall and stormwater. Any water that accumulates in the sump shall be inspected and pumped out to the Water Treatment Plant or removed from the site as Regulated Waste.	All persons	Slag stored indoors at all times, water to be removed as required.
Dried filter cake shall be stored in a skip inside the Water Treatment Building.	All persons	At all times
Liquid waste containers shall be stored indoors with secondary containment.	All persons	At all times
Pest and vermin controls (e.g., mice/rats, insects, etc.) shall be implemented in waste storage areas by appropriately licensed pest controllers.	Maintenance Manager	As required
Covered bins shall be provided to prevent access by vermin, contact with rainfall and to minimise odour emissions.	Maintenance Manager	At all times
The WTP shall be operated within the design specifications and routinely monitored and maintained to minimise odour emissions and maintain the required quality of effluent that is released to sewer as trade waste.	Maintenance Manager	At all times
All wastes removed from the site shall be transported by appropriately licensed transporters to facilities/users that are legally able to receive/use/dispose of the wastes.	Maintenance Manager	At all times
Spills of liquid or solid wastes shall be cleaned up immediately.	All persons	At all times
Personnel shall be trained in spill prevention and spill response/control procedures.	HSE Manager	At all times

Spill kits shall be located on-site. Ensure that spill clean-up kits are stocked and replenished appropriately and are in the correct location for use.	HSE Manager	At all times
Any liquid spills that occur are removed using 'dry' cleaning methods (e.g., use of absorbent materials, sweeping). The use of degreasers, detergents, and hosing down of areas is prohibited. All used absorbent materials shall be managed and disposed of as regulated waste.	All persons	At all times
No onsite disposal of wastes shall be permitted.	All persons	At all times
<b>Monitoring</b>		
Undertake inspections of waste storage areas to identify any compliance issues or maintenance requirements.	Maintenance Supervisor	Monthly
Undertake a review of site waste management practices to identify opportunities to improve waste management practices in line with the waste management hierarchy.	General Manager	Annually
Targeted inspections shall be undertaken of: <ul style="list-style-type: none"> <li>Scrap steel storage area CDA and retention pond to focus on water level and freeboard, liner condition and evidence of pests such as mosquitoes.</li> <li>Sump in the covered slag storage bay shall be inspected to determine if there is accumulated water in the sump requires removal.</li> </ul>	Maintenance Manager	Weekly
<b>Corrective Actions</b>		
Incidents in relation to waste management and disposal at the site shall be investigated by the General Manager to identify necessary corrective actions for implementation.		
<b>Reporting</b>		
Near misses or non-compliances shall be reported to the General Manager.	All persons	As required
All required records required under the Trade Waste permit shall be retained for at least 5 years.	General Manager	At all times
All regulated waste tracking forms shall be retained and kept or an Agents Agreement with the nominated regulated waste contractor shall be entered into. Records shall be retained for at least 5 years.	General Manager	At all times

## 5 Rehabilitation Plan

Where disturbed land at the site will not be subject to any further disturbance, it shall be rehabilitated.

Rehabilitation shall be planned and executed to ensure that:

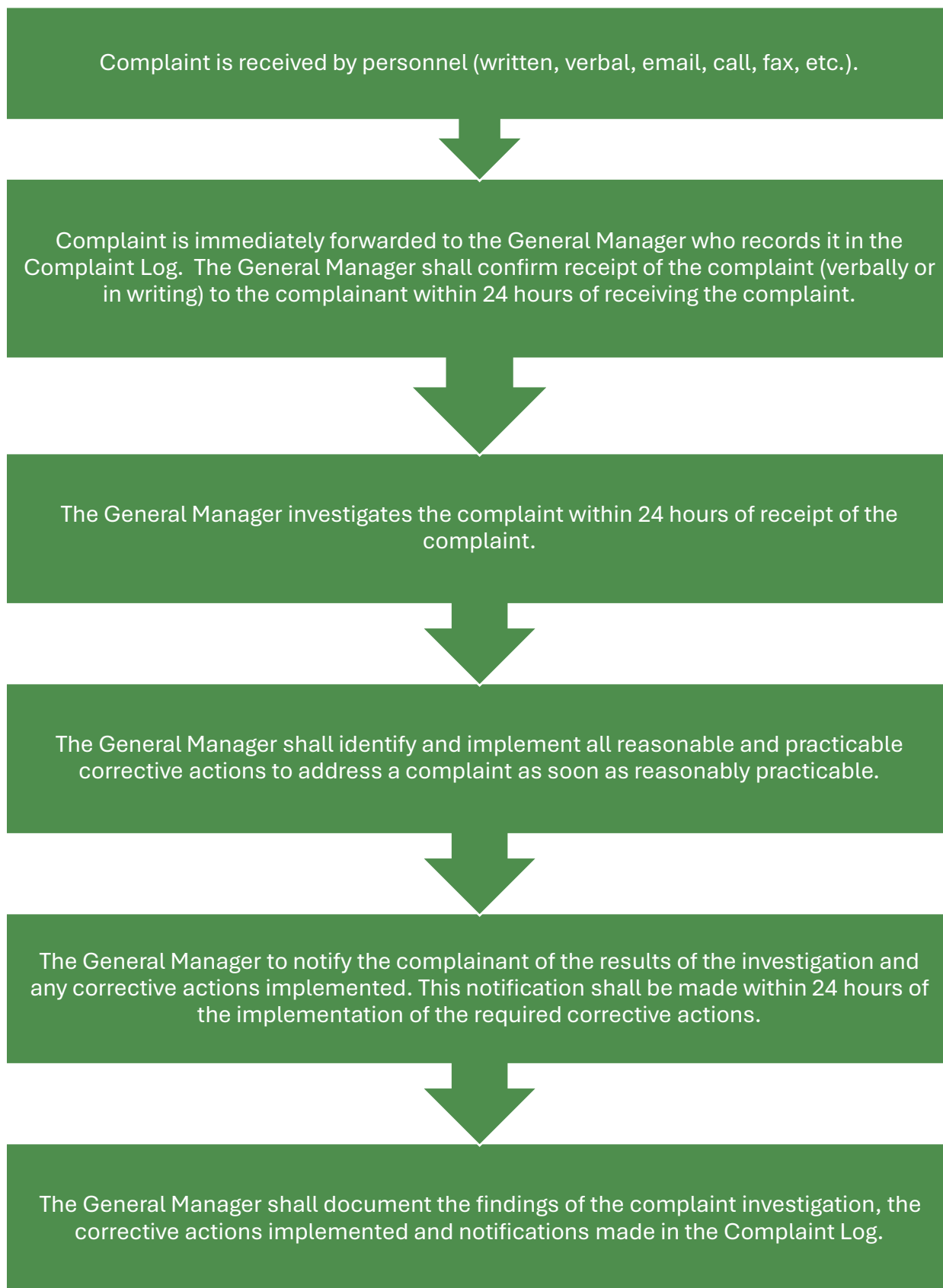
- Any infrastructure that is not required by the landholder is removed and infrastructure that is required by the landholder is left in a safe and stable condition.
- All liquid and solid wastes are removed from the site.
- Suitable vegetation for the location and any proposed future land use is established and sustained for exposed earthen surfaces to minimise erosion.
- The quality of soil and water, including seepage, released from the site does not cause environmental harm.
- The potential for environmental nuisance caused by dust is minimised.
- The final landform is stable and protects the safety of humans, stock and wildlife.

## 6 Complaint Management

The General Manager shall maintain and update the Complaint Log (Appendix C) for all complaints received. The following details must be recorded for all complaints received:

- Time, date, name and contact details of the complainant.
- Reason for the complaint.
- Any investigations undertaken.
- Conclusions formed.
- Any actions taken.
- Feedback to the complainant.
- Assessment of the complainant's attitude to the company's response.
- Further follow-up action as required.

The following procedure shall be used to manage all complaints received about the site (Figure 3).



**Figure 3 Complaint Management Procedure**

## 7 Environmental Hazards, Incidents & Emergencies

### 7.1 Categories of Environmental Harm

There are three (3) categories of environmental harm for environmental incidents and emergencies under the EP Act (Table 6).

**Table 6 Categories of environmental harm**

Category	Definition	Internal reporting required?	External reporting required?
Nuisance	An unreasonable interference or likely interference with an environmental value caused by: <ul style="list-style-type: none"> <li>Aerosols, fumes, light, noise, odour, particles or smoke; or</li> <li>An unhealthy, offensive or unsightly condition because of contamination; or</li> <li>Another way prescribed by regulation.</li> </ul>	Yes	Yes, but only if a breach of an EA condition (refer to Section 12.1)
Material	Environmental harm that: <ul style="list-style-type: none"> <li>Is not trivial or negligible in nature, extent or context; or</li> <li>Causes actual or potential loss or damage to property of an amount of, or amounts totalling, \$10K-\$100K; or</li> <li>Results in costs of \$10K-\$100K for actions to prevent or minimise the harm and rehabilitate or restore the environment to its condition before the harm.</li> <li>Note – Matters which are characterised as environmental nuisance (e.g., odour, noise, etc.) may constitute environmental harm that is material.</li> </ul>	Yes	Yes
Serious	Environmental harm that: <ul style="list-style-type: none"> <li>Is irreversible, or a high impact or widespread; or</li> <li>Causes harm to an area of high conservation value or special significance; or</li> <li>Causes actual or potential loss or damage to property of an amount of, or amounts totalling more than \$100K; or</li> <li>Results in costs of more than \$100K for actions to prevent or minimise the harm and rehabilitate or restore the environment to its condition before the harm.</li> <li>Note – Matters which are characterised as environmental nuisance (e.g., odour, noise, etc.) may constitute environmental harm that is serious.</li> </ul>	Yes	Yes

### 7.2 Environmental Hazards, Incidents & Emergencies

#### 7.2.1 Hazard and Incident Reporting

All environmental hazards, incidents and emergencies must be reported to the General Manger as soon as possible, but no longer than 24 hours after becoming aware of the matter.

All hazards, incidents and emergencies shall be investigated by the General Manager and any other relevant personnel to identify root causes and the appropriate course of action taken to prevent a recurrence. Corrective actions are to be evaluated on the basis of the hierarchy of controls with the aim of elimination of the impacts identified. This SBMP may require review and amendment following identification of a hazard, incident or emergency.

If a hazard, incident or emergency causes or threatens material or serious environmental harm, refer to Section 7.3 below for external reporting requirements.

### 7.2.2 Incident Management & Investigation

All incidents shall be investigated by the General Manager to determine:

- Nature, type, location and extent of the incident and the affected area.
- Actual and/or potential environmental impacts of the incident.
- Suspected cause/s of the incident.
- Measures required to stop any further environmental harm.
- Remedial measures required to correct any environmental harm.
- Management measures to be implemented to prevent a recurrence of the incident.
- Incident reporting requirements for regulatory authorities (refer to Section 7.3 below).

The requirements for the environmental assessment of impacts of an incident shall be determined by the General Manager, who may seek advice from an environmental consultant. If an incident involves serious or material environmental harm or a breach of an Environmental Authority condition, the regulatory authority may also advise/direct the environmental assessment.

The assessment may include environmental monitoring of a contaminant release. Based on the nature and type of the incident, the General Manager, in consultation with their environmental consultant, shall determine:

- Sampling and analytical requirements.
- Applicable guidelines or thresholds to apply to data for assessing compliance and level of impact.

## 7.3 External Reporting of Material or Serious Environmental Harm

All persons who become aware, or ought reasonably to have become aware, have a duty to notify the DETSI of incidents or emergencies that cause or threaten material or serious environmental harm. Environmental incidents or emergencies that cause or threaten material or serious environmental harm shall be reported to the DETSI in accordance with Table 7.

**Table 7 External reporting of material or serious environmental harm**

By	To	Within	Method
Plant Operators, employees, sub-contractors, or visitors	Relevant area manager or General Manager	24 hours of becoming aware of the matter.	Verbal or written.
	If a manager cannot be contacted, notification must be made directly to the DETSI.		Verbal initially followed by written.
Area managers	General Manager	Immediately.	Verbal or written.
		If the General Manager cannot be contacted within 24 hours, proceed with notifying the DETSI directly.	Verbal initially followed by written.
General Manager	DETSI	24 hours of becoming aware of the matter.  This 24-hour period starts as soon as the General Manager is first notified.	Verbal initially followed by written.

The Duty to Notify of Environmental Harm Guideline and the standard written notification form to the DETSI for material or serious environmental harm can be downloaded from the [DETSI website](#). Contact details for the DETSI are provided in Table 8.

**Table 8 DETSI contact details**

Method of contact	Details
Pollution Hotline	1300 130 372
Fax	(07) 3330 5875
Email	<a href="mailto:pollutionhotline@des.qld.gov.au">pollutionhotline@des.qld.gov.au</a>
Web	<a href="https://www.detsi.qld.gov.au/">https://www.detsi.qld.gov.au/</a>
Registered Post	Permit and Licence Management Department of the Environment, Tourism, Science and Innovation GPO Box 2454 Brisbane 4001

## 8 Emergency Preparation and Response

This section provides an overview of response requirements for environmental emergencies that could reasonably be expected to occur at the site during operations. Incident reports and investigations are to be completed for any emergency at the site.

### 8.1 Fire

A fire has the potential to threaten the safety or health of people, cause environmental harm, and/or damage infrastructure and equipment. The risk of fire at the site shall be reduced by:

- Provision and maintenance of firefighting equipment (e.g., fire extinguishers) at the site.
- Maintain plant and equipment in accordance with the manufacturer's specifications.
- Training site personnel in emergency response to fire and the use of fire safety equipment.
- Compliance with *AS1940-2017: The storage and handling of flammable and combustible liquids*.
- Regular housekeeping at the site and removing wastes on a regular basis to ensure combustible materials don't accumulate.
- Identification of a designated smoking area which is away from flammable and combustible materials and includes the provision of a cigarette bin.

### 8.2 Heavy Rain

The site is not mapped within a flood hazard area but may be subject to heavy rainfall. To prevent the potential contamination of stormwater and impacts on the downstream receiving environment, the following strategies shall be employed:

- Keep the site in a clean and tidy state at all times.
- If heavy rainfall is forecast, prepare the site by ensuring that plant, equipment, and materials are securely stored to minimise their contact with rainfall and stormwater.
- Ensure all leaks and spills have been cleaned up and the source of the leak/spill rectified.
- Ensure all stormwater quality controls outlined in the Stormwater Management Plan are maintained in accordance with the manufacturer's specifications and are in good working order.
- Prioritise the treatment and re-use of water in the lined retention pond at all times to reduce the water level as low as reasonably practicable.

### 8.3 Spill Response

A chemical spill has the potential to threaten the safety or health of people, create a fire hazard, and/or cause environmental harm. Where a chemical spill occurs, consult the SDS for spill clean-up procedures and any necessary Personal Protective Equipment (PPE).

Spill response kits shall be kept at strategic locations onsite (e.g., proximate to the diesel storages). Equipment contained within the spill response kit/s shall be replenished upon use, equal to the specified list contained with the kit. The General Manager shall ensure that spill response kits are inspected monthly and any missing items are replaced.

A spill response flow chart is provided at Figure 4 below. If a spill cannot be safely contained and controlled with onsite resources, the matter shall be referred immediately to emergency services by calling triple zero (000).

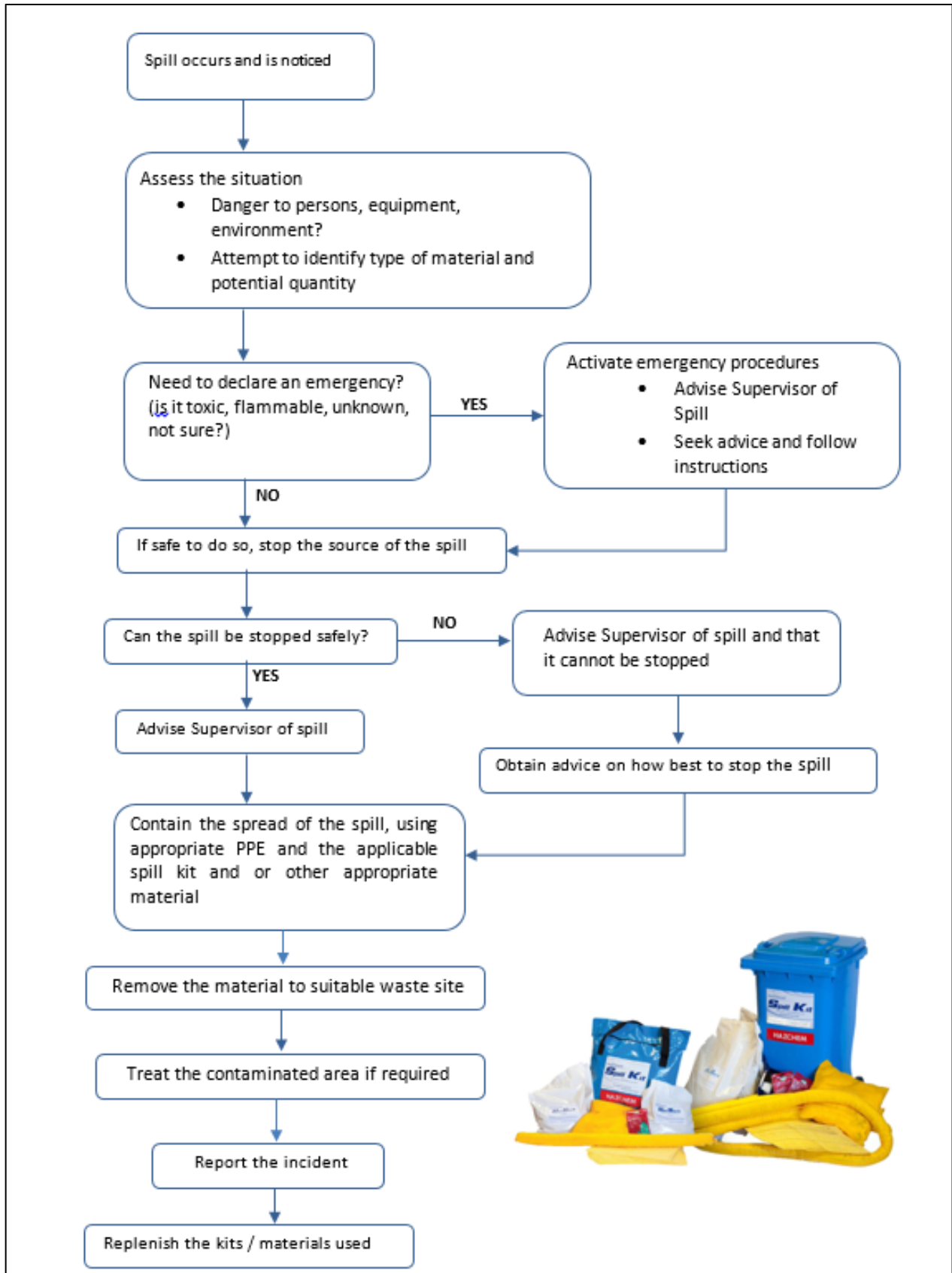


Figure 4 Spill Response Procedure

## 9 Inspections & Monitoring

### 9.1 Site Inspections

#### 9.1.1 Routine site inspections

The General Manager or their nominated delegate shall undertake monthly environmental site inspections of operations and work practices to:

- Ensure activities are being undertaken in accordance with approved procedures.
- Confirm that appropriate controls have been identified and are in place to minimise the risk of environmental harm.
- Identify any maintenance or workplace practice issues that need to be addressed.
- Identify potential environmental hazards that need to be addressed.

#### 9.1.2 Other inspections

Rainfall based site inspections shall be undertaken by the General Manager or their nominated delegate Prior to and after rainfall exceeding 10 mm in 24 hours.

Targeted weekly inspections by the Maintenance Manager or their nominated delegate shall be undertaken of:

- Scrap steel storage area CDA and retention pond to focus on water level and freeboard, liner condition and evidence of pests such as mosquitoes.
- Sump in the covered slag storage bay shall be inspected to determine if there is accumulated water in the sump requires removal.

### 9.2 Environmental Monitoring

Environmental impacts of routine and non-routine operations, incidents, and emergencies shall be assessed. Where environmental monitoring is required, it shall be completed by suitably qualified and experienced persons in accordance with legislated standards and guidelines.

All equipment used for environmental monitoring shall be fit for purpose and maintained, operated and calibrated in accordance with the manufacturer's specifications. Where analysis of samples is required, samples shall be submitted to a National Association of Testing Authorities (NATA) accredited laboratory.

Routine environmental monitoring requirements included in the Environmental Authority are below:

- Air emissions from the FTP (EA Condition A3.0).
- Onsite depositional dust quality monitoring (EA Condition A4.0).

Incident based monitoring in relation to complaints or events that cause or threaten environmental harm shall be undertaken as required.

A high-level alarm and seepage monitoring system shall be installed, maintained and monitoring at the lined retention pond.

Environmental monitoring records shall be retained and managed in accordance with Section 11.

## 10 Training and Communication

### 10.1 Environmental Awareness Training

#### 10.1.1 Inductions

A site induction shall be given to all personnel (staff, contractors and visitors) to ensure they are aware of their responsibilities and are competent to carry out works at the site. This shall include environmental awareness training which addresses the following:

- General Environmental Duty.
- Duty to Notify of Environmental Harm.
- Duty to Restore the Environment.
- Requirements of the SBMP.
- Environmental complaint, hazard and incident management and reporting.
- Emergency response.

Training records shall be maintained and kept onsite in accordance with Section 11.

#### 10.1.2 Ongoing Training

Ongoing staff training shall be undertaken as new activities are ready to start, new environmental risks are identified, or new processes are developed. This will usually be incorporated into a regular toolbox meeting and/or risk assessments prior to undertaking the job. Records of the special training sessions will be in a similar format to toolbox meeting minutes.

### 10.2 Internal Communication of Environmental Information

The General Manager shall communicate information regarding environmental matters to site personnel on an as-required basis. The method of communication shall be determined by the General Manager.

Protocols for internal reporting of environmental hazards, incidents and emergencies are outlined at Section 7.

### 10.3 Communication with Regulatory Authorities

There is no requirement for routine communication with regulatory authorities regarding environmental matters. The following statutory environmental notification requirements apply to the site:

- Environmental hazards, incidents and emergencies that cause or threaten material or serious environmental harm shall be reported to regulatory authorities in accordance with Section 7.
- Any breach of the conditions of the Environmental Authority must be reported by the General Manager to the administering authority within 24 hours of becoming aware of the breach.
- The site shall be notified to the DETSI within 20 business days of the operation commencing for undertaking Notifiable Activity 17 Foundry operations – commercial production of metal products by injecting or pouring molten metal into moulds and associated activities in works having a design capacity of more than 10 t per year. GM Steel shall provide notice to the DETSI regarding any other Notifiable Activities that are undertaken at the site as required.

## 11 Records Management

The General Manager shall be responsible for managing environmental records for the site in accordance with GM Steel's HSE management system procedures. All environmental and site maintenance records shall be retained for no less than five (5) years and be made available upon request by regulatory authorities.

Examples of records may include, but not be limited to, the following:

- Site observations and site diary entries.
- Complaints.
- Incidents, incident investigations, and associated restoration work.
- Results of any environmental monitoring.
- Correspondence with regulatory authorities or any other party.
- Waste disposal.
- Environmental management performance reviews.
- SBMP updates.
- Site emergencies.
- Training.

## 12 Review and Improvement

### 12.1 Non-conformance & Corrective Actions

A non-conformance is defined as failure to comply with the requirements of this SBMP, regulatory requirements, and conditions of approvals and permits. Non-conformances may be identified through monitoring, inspections or incident investigations.

Non-conforming activities shall be stopped by any person at the site in consultation with the General Manager. The activity shall not recommence until an appropriate corrective action has been implemented. A corrective action must be identified and implemented for each identified non-conformance.

Any breach of the conditions of the Environmental Authority must be reported by the General Manager to the administering authority within 24 hours of becoming aware of the breach. Records of the breach must be kept and include details of the breach, notifications made to the administering authority, and corrective actions taken.

### 12.2 Environmental Management Performance Reviews

Environmental management performance reviews shall be undertaken annually as part of the continual improvement process. Reviews may also occur in addition to the annual reviews in response to matters that affect environmental management (e.g., incidents, emergencies, changes to site conditions or operations, permit conditions or legislation changes, etc.). The annual environmental management review shall be undertaken by the General Manager and any other key staff. The review shall consider:

- Monitoring and inspection results for the past year.
- Recent and relevant incidents and any lessons learnt.
- Management of complaints.
- Feedback from regulatory authorities.
- Tabling of any new legal or other obligations.
- The effectiveness of environmental controls.
- Adequacy of resources for environmental management.

Findings, actions, timeframes and the responsible parties shall be recorded in accordance with Section 11.

### 12.3 SBMP Review and Update

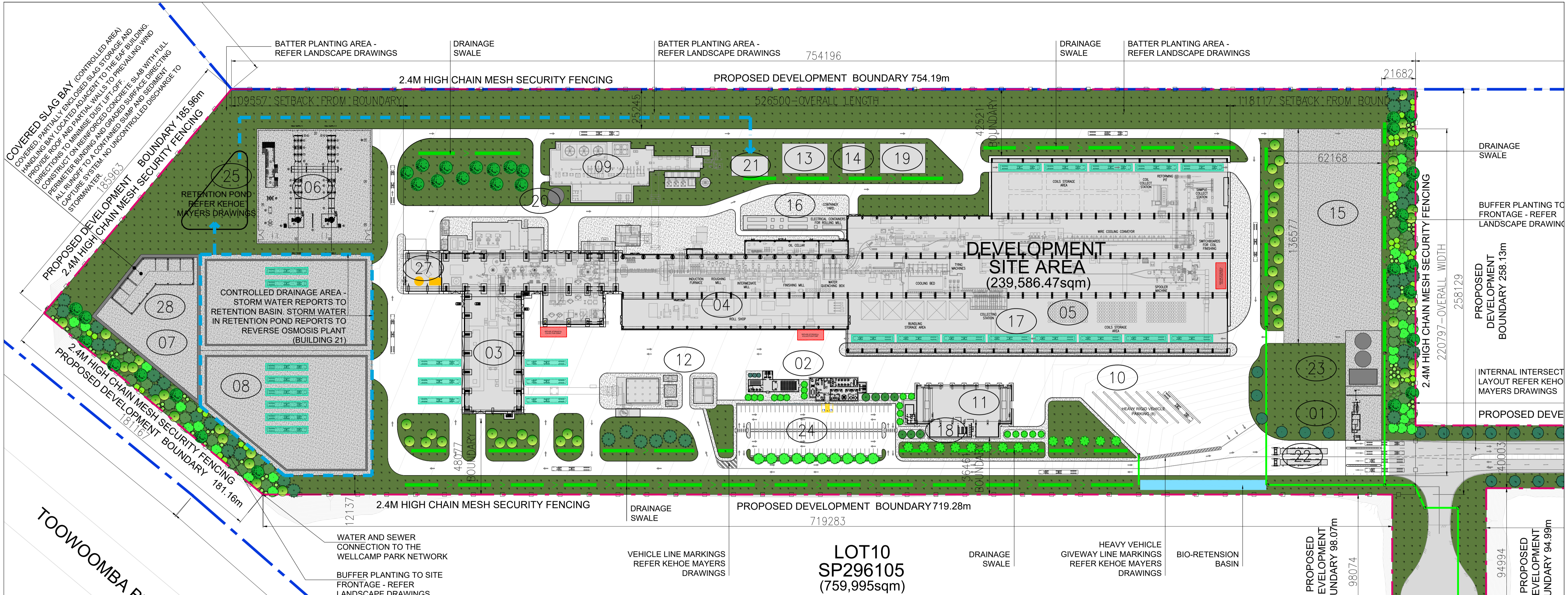
The SBMP shall be reviewed at least annually by the General Manager to determine if the management measures are appropriate for operations and site conditions. If the SBMP is not appropriate for the operations and site conditions at the time of the review it shall be updated accordingly.

Other triggers for review and update of the SBMP outside of the annual review cycle may include, but not be limited to:

- Following the issue of project approvals and permits.
- After an incident that causes environmental harm.
- Changes to the risk profile of the operation.
- Changes to relevant legislation or project approvals.
- Changes to operational methods or site conditions that require additional or alternative environmental controls to manage risk to environmental values.

# Appendices

## Appendix A Development Plans



PROG. Nr.	ITEM DESCRIPTION
01	ENTRY GATE
02	ADMINISTRATION BUILDING
03	MELT SHOP PLANT
04	ROLLING MILL
05	STORAGE AREA
06	MAINS RECEIVING SUBSTATIONS
07	SLAG MANAGEMENT AREA
08	SCRAP STORAGE & PREPARATION AREA
09	WATER TREATMENT PLANT AREA
10	TRUCK PARKING
11	GENERAL WAREHOUSE AND MAINTENANCE SHOP
12	FLUE TREATMENT PLANT
13	INDUSTRIAL GAS

14	LNG (LIQUID NATURAL GAS)
15	COMMON LAYDOWN AREA
16	CONTAINER YARD
17	STEEL PACKING
18	FERROALLOYS BUILDING AREA
19	DIESEL TANK
20	POTABLE WATER STORAGE TANK
21	REVERSE OSMOSIS PLANT
22	WEIGH BRIDGE
23	FIRE PUMP ROOM - FIRE TANK AND PUMPS
24	CAR PARKING AREA
25	RETENTION POND AREA
26	DETENTION BASIN AREA
27	COAL (BIO-CARBON), LIME & DOLOMITE AREA
28	COVERED SLAG HANDLING AND STORAGE BAY INCORPORATING A ROOF AND PARTIAL WIND SHIELDING, DESIGN TO MINIMISE DUST EMISSIONS AND CONTROL STORM WATER INTERACTION WITH SLAG MATERIALS

**LEGEND**

		<b>CAR PARKING BAYS</b> 129 (1-129)
		<b>TRUCK PARKING BAYS</b> 08 (01-08)
		<b>TOTAL PARKING BAYS</b> 137
		REFER TO TRAFFIC REPORT

# DEVELOPMENT APPLICATION

## Not for construction

SCALE IN METRES 1:1250 @ A1 SIZE & 1:2500@A3

**NOTES:**  
 ALL DISCREPANCIES ARE TO BE REPORTED TO DESIGNER PRIOR TO THE COMMENCEMENT OF ANY WORK ON SITE.  
 THE CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING ANY WORK OR THE MAKING OF ANY SHOP DRAWINGS.  
 ALL SCALED DIMENSIONS MUST BE VERIFIED ON SITE.  
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DATE	REV	NOTE	BY
23/12/25	4	UPDATE SLAG AREA & ISSUE FOR DEVELOPMENT APPROVAL	IB
22/10/25	3	ISSUE FOR DEVELOPMENT APPROVAL	IB
24/08/25	2	ISSUE FOR DEVELOPMENT APPROVAL	IB
03/07/25	1	ISSUE FOR DEVELOPMENT APPROVAL	IB



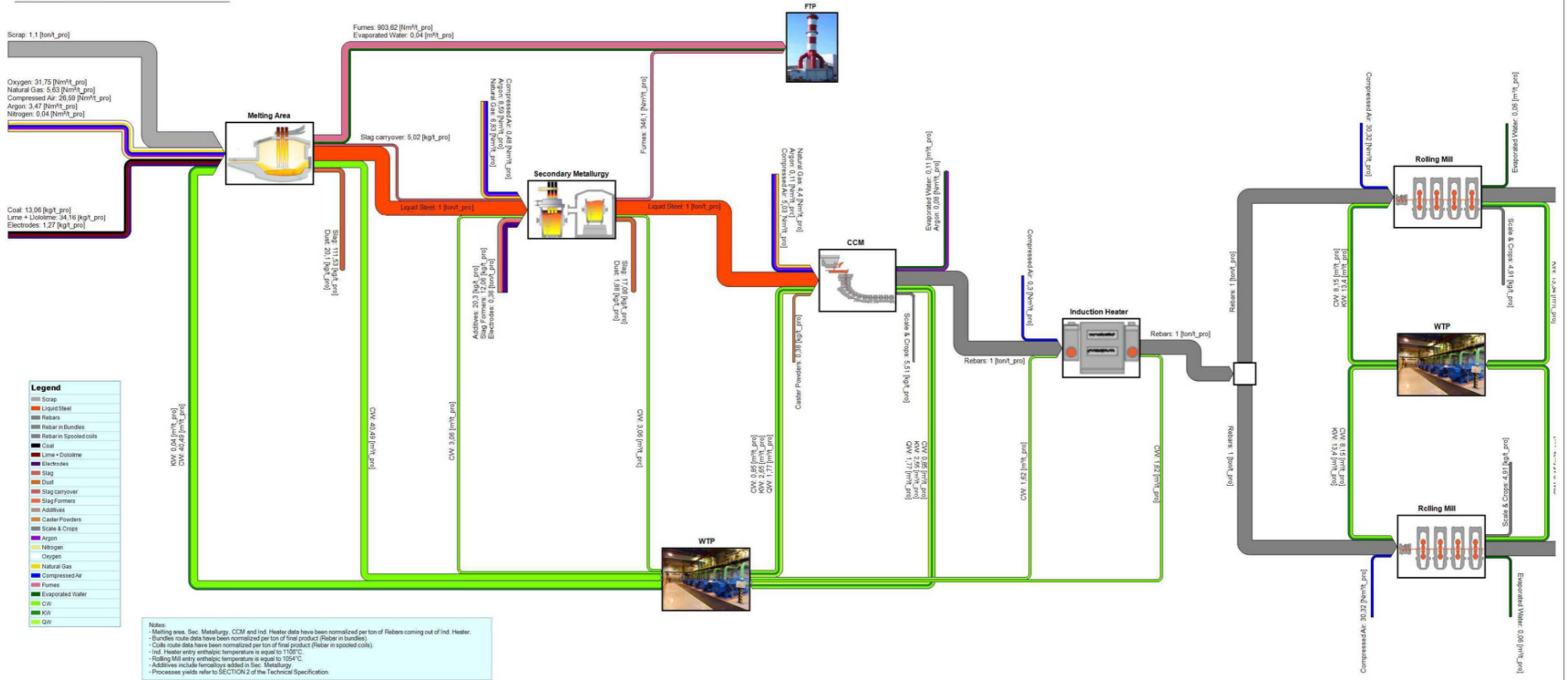
**NOTE:**  
 1. THIS DRAWING IS BASED ON CAD DRAWINGS PROVIDED TO DEZINE @ 310625 BY KEHOE MYERS CONSULTING ENGINEERS PTY LTD.

GM STEEL WELLCAMP DEVELOPMENT FLOOR PLAN  
 CEICIL PLAINS RD, TOOWOOMBA, QLD, 4350.  
 DEVELOPMENT APPROVAL



**GM STEEL WELLCAMP** Job Number: 1123/25  
 DEVELOPMENT FLOOR PLAN  
 REVISION DATE: 23/12/25 SCALE: 1:1250 @ A1  
 REVISION: 4 DWG NO: DA 01

**Mass Balance**



**MASS BALANCE DIAGRAM - Process Schematic**

Not To Scale - For Reference Only

**DEVELOPMENT APPLICATION**  
Not for construction

**NOTES:**  
ALL DISCREPANCIES ARE TO BE REPORTED TO DESIGNER PRIOR TO THE COMMENCEMENT OF ANY WORK ON SITE.  
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DATE	REV	NOTE	BY
22/10/25	1	ISSUE FOR DEVELOPMENT APPROVAL	IB



**NOTE:**  
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GM STEEL WELLCAMP  
CECIL PLAINS RD,  
TOOWOOMBA, QLD, 4350.

PROCESS SCHEMATIC –  
MASS BALANCE DIAGRAM  
DEVELOPMENT APPROVAL



<b>GM STEEL WELLCAMP</b>		Job Number: 1123/25
PROCESS SCHEMATIC – MASS BALANCE DIAGRAM		
WORK DATE: 22/10/25	SCALE: NTS	REV: A1
ISSUE DATE: 22/10/25	ISSUE BY: IB	ISSUE NO: DA 29



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**6.1.1. GENERAL DESCRIPTION**
**6.1.1.1 Technical Characteristics**

The plant is dimensioned to cool and treat the water flowing to the consumers listed below with these main operation parameters:

<b>System QW - Closed cooling circuits</b>						
		<b>Q m<sup>3</sup>/h</b>	<b>P<sub>IN</sub> bar</b>	<b>ΔP bar</b>	<b>T<sub>IN</sub> °C</b>	<b>T<sub>OUT</sub> °C</b>
1	CCM PRIMARY	120	17	15	38	48

<b>System CW - Non-contact cooling circuits</b>						
		<b>Q m<sup>3</sup>/h</b>	<b>P<sub>IN</sub> bar</b>	<b>ΔP bar</b>	<b>T<sub>IN</sub> °C</b>	<b>T<sub>OUT</sub> °C</b>
1	CCM TERTIARY	75	7	5	35	48
2a	E.A.F Circuit a	915	6	4	35	43
2b	E.A.F. Circuit b in series after 2a*	450	6	4	43	51
3a	ECS Circuit a	1261	6	4	35	43
3b	ECS Circuit b in series after 3a*	685	6	4	43	51
4	LF + Q-ONE	262	6	4	35	48
3	FUME TREATMENT PLANT	550	6	4	35	55
6	PLATE HEAT EXCHANGERS	120	3	1.5	35	45
7	ROLLING MILL + INDUCTION FURNACE	660	4.5	2.5	35	42
8	CAP + HVAC (**)	400	6.0	2.5	35	45
		<b>4243</b>				

<b>Emergency circuit</b>						
		<b>Q m<sup>3</sup>/h</b>	<b>P<sub>IN</sub> bar</b>	<b>ΔP bar</b>	<b>T<sub>IN</sub> °C</b>	<b>T<sub>OUT</sub> °C</b>
1	CCM PRIMARY	40	3	-	38	-
2	CCM TERTIARY	11	3	-	35	-
3	EAF	220	3	-	35	-
4	ECS	340	3	-	35	-
5	INDUCTION FURNACE	24	3	-	35	-

<b>System KW - Contact cooling circuits</b>						
		<b>Q m<sup>3</sup>/h</b>	<b>P<sub>IN</sub> bar</b>	<b>ΔP bar</b>	<b>T<sub>IN</sub> °C</b>	<b>T<sub>OUT</sub> °C</b>
1	CCM SPRAYS+TERTIARY	135	18,5	18,5	35	55
2	Q.T.B.	190-620	14-17	14-17	32	40
3	Spooler Line	275-620	14-17	14-17	32	40
4	Fast Finishing Block	85	12.5	12.5	32	40
5	STANDS 5-16/STANDS	336	6	6	40	48
6	STANDS 1-4/STANDS	221	6	6	40	48
		<b>840</b>				

**Notes:**

All pressure figures are BARG (bar gauge), referred at 0.00 level.

Spool line alternative to bar line

QTB/Spooler line in series to Stands

**6.1.1.2 Design and Basic Data**

Make-up industrial water has the following data:

WATER PARAMETERS	DESIGN	UNIT
pH	7.5÷8	
TDS Total Dissolved Solids	160	Ppm
Conductivity	280	μS/cm
Total hardness	80	ppm CaCO <sub>3</sub>
Calcium hardness	70	ppm CaCO <sub>3</sub>
M alkalinity	60	ppm CaCO <sub>3</sub>
Chlorides	30	ppm
Sulphates	30	ppm
TSS Total Suspended Solids	< 5	ppm
Silica	10	ppm SiO <sub>2</sub>
Total iron	< 0.05	ppm Fe
Manganese	< 0.05	ppm Mn
Total organic carbon	< 2	ppm
Oil and grease	< 1	ppm

ENVIRONMENTAL DESIGN DATA	DESIGN	UNIT
Maximum dry bulb temperature	+ 36	°C
Minimum dry bulb temperature	- 2	°C
Wet bulb temperature	+ 25.4	°C
Altitude	< 100	meters above sea level

Environmental data designs are according “2021 ASHRAE Fundamental Handbook”.

Reference city Brisbane Australia

TIPOLOGY	DESIGN CODES
Filter pressure vessels Piping and valves Instrumentation Steel structure Corrosion category valid for equipment Corrosion category valid for valves	ASME BPVC Sect VIII Danieli PSM according ANSI/ASME ISA AISC Corrosion protection by protective paint system according to EN ISO 12944-2 According to manufacturer standard

UTILITIES	CONDITIONS at T.O.P.
Water Supply  Compressed air	Refer to previous table and to point 1.1.2. Min. pressure 2 bar 5,5 bar; dew point -10°C on absolute min. ambient temperature; SS0,01 µm; oil ≤ 0,1 ppm

**General notes**

The process and relevant scope of supply is based on the above analysis of water and environmental data.

The technical data and specification of the equipment should be considered as preliminary.

The final data and quantities will be defined during engineering phase.

### 6.1.2. DESIGN CONCEPT

The cooling service water is circulating within separate circuits, depending on the operative features of the operations and on the quality of the service water itself. A central PLC and relevant remote I/O units control all equipment of WTP.

The plant management shall be carried out by the control panel located in the WTP.

All process diagrams and alarms are inserted in the video pages of the HMI system.

Generally, plant operation is controlled by simple loops using switching devices and local process measurements.

The main figures of the process are also indicated in the remote control panel.

Instrumentation devices for temperature, pressure and flow-rate are considered as follows:

- The main pumping stations related to the technological users are provided with relevant remote flow indication (flow transmitters) FI.
- In the cooling water cold wells a temperature control with transmitter (TIC) is foreseen.
- In all water collecting tanks a level control switch (LCS) is foreseen.
- In storage tanks (if any) remote level control and indication (LCI) is foreseen.
- All the pumps are provided with pressure gauges on delivery side.
- All the cooling systems are completed with one corrosion-rack device for corrosion coupons.

Emergencies on Water Treatment Plant, i.e. power fault, PLC fault etc. (WTP is completely shut down) are handled by elevated water tank and related pumps (one diesel pump and one electrical pump fed by a generator). The emergency automation system is a “**hard wired system**”, based on electro-mechanical relay logic, in order to comply with the emergency cooling requirements of the technological users of the plant.

#### 6.1.2.1 System CW/QW – Closed / Non-contact cooling circuits

Non-contact circuits are provided for cooling the CCM mould and machine, EAF, LF, fume treatment plant and ECS.

A closed circuit is provided for CCM mould and consists of water-water heat exchangers, a water collecting basin and pumping stations for delivering the cooled water to the users.

The hot water of secondary side of plate heat exchanger is cooled in an open circuit by means of an induced draft-cooling tower. The same open circuit provides also to cool the other non-contact users such as: EAF, LF and fume de-dusting plant. Some users of the EAF (roof) and of the ECS are cooled in series. A dedicated pumping station is installed in the tech. area to ensure the required pressure to the “in series” users.

The cooled water, collected in the basin is delivered to the users by pumping stations.

The CCM mould is connected, for the emergency system, to a dedicated emergency elevated tank (bottom level + 35 m above the ground) with a capacity to guarantee the overall emergency time

The CCM machine, EAF and ECS are connected, for the emergency system, to emergency elevated tanks (bottom level + 35 m above the ground). An electrical and diesel motor pumping stations are provided both for refilling the emergency tank and for the continuous cooling of EAF & ECS.

The water quality for refilling the no-contact cooling open circuit is make-up water indicated in 1.1.2, while softened water is necessary for mould closed circuit.

In the various circuits equipment for metering adequate conditioners is also included.

### **6.1.2.2 System KW - Contact cooling circuits**

The QTB/Spooler line discharged water is collected in a hot well where pumps feed the Stands 1 to 16. This allow to dramatically reduce the overall flowrate to be treated while still providing the correct water quality to each technological equipment.

Danieli has also improved the common standard approach to mill systems in order to reach the same results in the water cleaning but allowing significant CAPEX saving in the overall installation.

This new solution is based on a proper partition of the overall mill collecting flume.

CCM, stands 1÷4 and 5÷16 contact water is collected in scale pit.

The scale pits are provided with oil skimming device and one mechanical submersible grab bucket for the periodical collection & removal of the scale settled on the bottom of the pit. In the scale pit the water, thus clarified, overflows to the adjacent basin, where the pumping station sends it to the sedimentation tank.

The second part of the RM flume (QTB & Spooler line cooling) is collected in another pit (geometrically designed to avoid scale deposit) from where submersible pumps deliver the dirty water to the sedimentation section located in the WTP area.

One more pump is considered for the concrete channel flushing.

Sedimentation section consists of a longitudinal clarifier equipped with automatic scale removal system composed by scraper, hoist and bucket

Clarified water from the longitudinal clarifier enters, by gravity, to the clarified water basin.

From here, the clean water is pumped by a common pumping station to the filtration system (Danfilters®) and to cooling towers before being delivered to the users again.

Each main pumping station is equipped with a stand-by pump.

The periodical backwashing of the quartz granulate filter is performed by the same feeding pump. The air is supplied by an electro-blower.

Danfilter® is washed by timer operation. The pressure drop of the filtration battery (Danfilters®) is checked by a differential pressure gauge with a setting contact. In case of earlier increase of the filter pressure drop, extra backwashing is necessary. Sand filters operate in line and are backwashed off-line in automatic mode.

The backwashing outlet water flows by gravity to a drain pit & pumped to flash mixing pit, where it is added with a proportional dosage of polyelectrolyte and it enters the sludge thickener.

The sludge thickening process, helped through the addition of the flocculant, efficiently takes places. The overflow water flows from the top into the collecting cold basin. The thickened sludge is then automatically discharged, according to the torque signal sent by a special sensor, by means of a pumping station into a mixing pit for dewatering preparation. After a further polyelectrolyte dosage, with the thickened sludge suspension effective stirred by a proper mixer. The sludge will be pumped and treated with dewatering system before to be collected as waste from Client.

Make-up water is used to refill the circuits. They must be chemically and biologically conditioned, using chemical agents.

**6.1.2.3 Make-up water treatment**

Two water qualities are necessary for the circuit's make-up:

- Make up industrial water (by Customer)
- Softened water (Produced by new softening plant – by Daniemi)

The average consumption of industrial water as make-up is 77 m<sup>3</sup>/h approx.

The average consumption of soft water as make-up is <1 m<sup>3</sup>/h approx.

**6.1.2.4 Blow down water quality**


The following table shows the expected water quality to be discharged at plant take over point, assuming the make-up water quality shown at paragraph 1.1.2.

The effluent final disposal is at Customer's care.

WATER PARAMETERS		UNIT
pH	7-9	
Temperature	< 40	°C
TDS Total Dissolved Solids	< 600	ppm
Conductivity	< 1000	µS/cm
Total hardness	< 350	ppm CaCO <sub>3</sub>
Calcium hardness	< 250	ppm CaCO <sub>3</sub>
M alkalinity	< 300	ppm CaCO <sub>3</sub>
Chlorides	< 150	ppm
Sulphates	< 150	ppm
TSS Total Suspended Solids	< 30	ppm
Silica	< 50	ppm SiO <sub>2</sub>
Total iron	< 5	ppm Fe
Oil and grease	< 5	ppm
B.O.D.	< 10	ppm O <sub>2</sub>
C.O.D.	< 20	ppm O <sub>2</sub>
Total bacteria count	< 10000	

Figures above do not include chemical conditioning products contribution.

**6.1.3. MECHANICAL EQUIPMENT**
**6.1.3.1 Pumping Station**

<b>Submersible Centrifugal Pumping Station</b>								
<b>Components:</b>								
A – Casing					E – Driver			
B – Impeller					F – Coupling: direct			
C – Shaft					G – Base			
D – Shaft seal					H – Lifting guides: wire			
<b>General features</b>								
<b>Technical description:</b>								
<p>Centrifugal submersible pumps in suitable execution, for dirty water.</p> <p>The centrifugal pumps will be designed, manufactured, positioned, painted, tested and commissioned as per Daniemi GENERAL SPECIFICATION GS-M-03 and Manufacturer Standard.</p> <p>Pump materials &amp; construction must take into account both a “continuous duty” at full load, and “start and stop” for many times per hour.</p> <p>Selection must take into account the suspended solids content, the temperature of the surrounding fluid, and avoiding cavitation at any operating condition.</p> <p>Control devices must control internal leakage with an alarm signal to HMI in case of humidity presence.</p> <p>The motor must be hermetically closed (IP 65) and the size will be designed for proper cooling by the surrounding water.</p> <p>A thermal detector on windings must control over-temperature protection.</p> <p>The base of the pump must be duck-foot type, with delivery flanged bend, to coupling the delivery pipe.</p> <p>The pump can be easily removed and re-positioned by means of lifting guides and a chain.</p> <p>Pumps are automatically started and stopped according to the level in the basin. Moreover, the global system is automatically controlled by PLC: low-low level in the basin, and other technical or functional interlocks, unconditionally stop the pumps and send the relevant signal to HMI in the control room.</p> <p>Motor poles number is four (4), fixed speed type.</p> <p><b>GUARANTEE PARAMETERS:</b></p> <p>Flow rate, head and Efficiency according to ISO 9906 acceptance grade 2B.</p>								
<b>Characteristics</b>								
ITEM	Nr. of pumps	Impeller Type	Flow-rate at duty point	Head at duty point	Temperature of media	Motor rating	Casing and Impeller materials	Motor
	<b>N°</b>		<b>m³/h</b>	<b>bar</b>	<b>°C</b>	<b>kW</b>		
F51WPS	2	CH	30	2.0	35	3	CN	AC-3
C51WPS	2	CH	360	2.5	50	52	CN	AC-3
C59WPS	1	CH	120	2	50	13	CN	AC-3
C53WPS	3	CH	242	2	48	30	NN	AC-3-FC
C60WPS	1	CH	100	2.5	48	17.5	NN	AC-3

**LEGEND**

channels CH  
open channel OC  
vortex V

**Casing and Impeller materials**

Hardened cast iron – H.C.I. NN  
Cast iron – Hardened or coated Cast iron CN  
Cast iron – Cast iron CC

**Motor**

Asynchronous 3-phase AC-3  
AC-3 frequency controlled by inverter AC-3-FC

### Horizontal Centrifugal Pumping Stations

**Components:**

A – Casing  
 B – Impeller  
 C – Shaft  
 D – Shaft seal

E – Driver  
 F – Coupling  
 G – Baseplate

#### General features

**Technical description**

Centrifugal horizontal pumps in normal execution, for clean water.  
 The centrifugal pumps will be designed, manufactured, erected, tested, painted and commissioned as per Danieli General Specification GS-M-03 and Manufacturer Standard.

Pumps must be constructed for continuous duty at full load.

Selection must take into account to avoid cavitation at any operating condition. Net positive suction head (NPSH) required by the pumps must be therefore lower than that available in the system.

The seals must be accessible for easy inspection and replacement.

Pumps and drivers must be connected through a flexible coupling (or double cardan joint/ flexible coupling for motor diesel drive pumps), with a spacer for easy maintenance.

Relevant coupling & spacer guard must be provided.

All pumps have to be completed with base-plates of manufacturer's standard.

Pumps will be manually started, and then the operation of the system will be automatically controlled by PLC: low level in the basin, or other technical interlocks, automatically will stop the pumps and send a proper signal to HMI in the control room.

**GUARANTEE PARAMETERS:**

Flow-rate, head and Efficiency according to ISO 9906 acceptance grade 1B or 2B.

Sound pressure level (SPL) of each complete installation (pumps+motor) will be <85 dB(A) according to DIN 45.635- correction factor K2 for motor power < 250 kW.



#### Characteristics

ITEM	Nr. of pumps	Impeller Type	Flow-rate at duty point	Head at duty point	Casing and Impeller materials	Motor rating	Shaft seal	Motor	Coupling
	N°		m <sup>3</sup> /h	bar		kW			
B21WPU	2	ES	120	18	CA	103	M	AC-3	E+S
A21WPB	2	ES	450	4	CA	86	M	AC-3	E+S
A22WPB	3	ES	343	4	CA	86	M	AC-3	E+S
A41WPU	3	ES	330	5.5	CA	103	M	AC-3	E+S
A21WPU	5	SC	750	7	CA	232	M	AC-3	E+S
A22WPU	2	ES	75	8	CA	34	M	AC-3	E+S
A03WPU	1	ES	595	4.5	CA/CB	152	M	AC-3	E+S
A03WPM	1	ES	595	4.5	CA/CB	-	M	GAS	E+S
A61WPU	2	ES	120	3.5	CA	25	M	AC-3	E+S
A71WPU	2	ES	400	7.0	CA	152	M	AC-3	E+S
C52WPU	2	ES	560	7.5	CA	206	M	AC-3	E+S
F01WPU	2	ES	100	1.5	CA	13	M	AC-3	E+S
C42WPU	3	ES	310	9.5	CA	152	M	AC-3	E+S
C21WPU	2	ES	220	13.5	CA	152	M	AC-3	E+S
C81WPU	3	ES	425	3	CA	63	M	AC-3	E+S
A04WPU	2	ES	350	2.5	CC	42	M	AC-3	E+S

**LEGEND**

Casing		Shaft seal		Coupling	
End-suction	ES	packing	PK	elastic+spacer	E+S
Split case	SC	mechanical	M	direct	D
Multi stage	MS				

**Casing and Impeller materials**

AISI-AISI	AA
Cast iron-AISI	CA
Cast iron – Cast iron	CC
Bronze-bronze	BB
Cast iron - bronze	CB

**Motor**

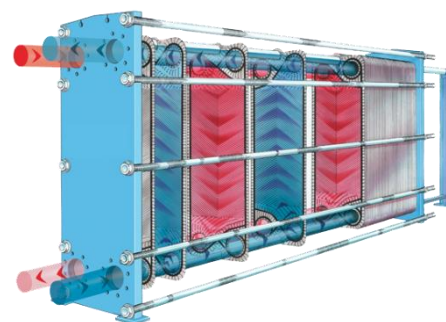
Diesel	DS
Asynchronous 3-phase	AC-3
AC-3 frequency controlled by inverter	AC-3-FC

**6.1.3.2 Cooling tower**

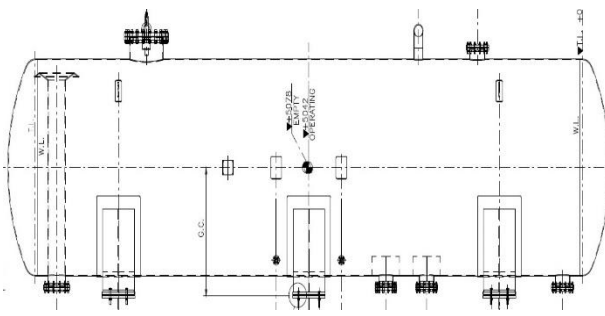
<b>Modular Package Cooling Tower</b>					
<b>Components:</b>					
A – Frame Structure		D – Filling			
B – Water distribution pipe		E – Fan Unit			
C – Drift Eliminator		F – Motor			
<b>General features</b>					
<b>Technical description</b>					
<p>Mechanical type: air-flow needed for the cooling process is supplied by fans driven by electric motors.</p> <p>Each cell is independent of each other for operation and maintenance purpose and permits maintenance without affecting the operation of the nearby one.</p> <p>The filling pack assures a large surface area for heat transfer and water evaporation and in the same time maintains the pressure drop of air flow to a very low level.</p> <p>A removable type drift eliminator is installed above the dispersion system to prevent water droplets carried over by cooling air leaving the fill.</p> <p>Induced draft type: Fans are axially, multi-blade type and are placed on the high section of the cell, from where aspirate the air from the bottom. The fan is perfectly balanced for each tip angle, but the angle of blades can be easily adjusted when fan is out of service.</p> <p>The cooling capacity changes according to atmospheric factors, mainly on wet bulb temperature of the inlet air. The towers have maximum cooling capacity at design site conditions.</p> <p>The fan motors are started and/or stopped in automatic sequence, in accordance with the design cold water temperature, controlled by a temperature transmitter located in the basin.</p> <p>The water distribution system, inside the cooling tower is pressure type with a main header and secondary pipes. These are fitted with spray nozzles, exactly spaced to guarantee uniform water feed to all cross section of the cell.</p> <p>Nozzles are no-clogging type of proper diameter to avoid any problem during normal operation.</p> <p>The equipment will be designed, manufactured, erected, tested, painted and commissioned as per Manufacturer Standard.</p> <p>Sound pressure level for each fan &lt; 85 dB(A), measured at 1.5 m from cooling towers louvers and 1.5 m from ground level. Tolerance on measurement method as per DIN 45635 KL3 (ISO 3746 – Grade 3 accuracy Survey method): ± 2 dB.</p>					
<b>ITEM</b>				<b>A01WCT</b>	<b>C01WCT</b>
Tower configuration	Type			Crossflow - Counterflow	Crossflow - Counterflow
Mechanical air supply	Type			Induced draft	Induced draft
Quantity of cells (tentative)	N°			5	2
Total water flow-rate	m <sup>3</sup> /h			4243	850
Hot water temperature	°C			49	49
Cold water temperature	°C			35	32
Type of filling				FILM	FILM
Material of filling		PVC	PVC		
Motor power each cell (tent.)	kW	30	22		
Coupling		Direct / Belt	Direct / Belt		
Construction type		Modular package	Modular package		
Frame Structure execution		Painted or galvanized Carbon steel / Reinforced fibre plastic FRP	Painted or galvanized Carbon steel / Reinforced fibre plastic FRP		
Stack execution		Painted or galvanized Carbon steel / Reinforced fibre plastic FRP	Painted or galvanized Carbon steel / Reinforced fibre plastic FRP		
Louvers execution		Painted or galvanized Carbon steel / Reinforced fibre plastic FRP	Painted or galvanized Carbon steel / Reinforced fibre plastic FRP		

**6.1.3.3 Heat Exchanger**


<b>Heat Exchanger</b>			
<b>Components:</b>			
A – Plates B – Frame plates C – Gaskets D – Carrying bars			
<b>General features</b>			
<b>Technical description</b>			
<p>Heat exchangers are water/water plate type.</p> <p>Heat exchanger plates are press-formed in thin sheets of proper material. The special shape is properly designed to maintain uniform turbulent distribution of flow through each unit, in order to maximise the cooling efficiency at design conditions and to reduce fouling effect on internal surfaces.</p> <p>All the system, number, shape and size of plates, are designed to maintain the pressure drop, on both primary and secondary side, of approx. 10 m w.c., during normal operating conditions.</p> <p>The frame plates are made in carbon steel of proper thickness, tie-rods and bolts are in special steel. Both are designed for nominal pressure. The upper and lower carrying bars are supported and held apart by fixed frame plate at one end and supporting column at the other end.</p> <p>Necessary anchor bolts are provided.</p> <p>Each exchanger is equipped, on hot and cold side, with:</p> <ul style="list-style-type: none"> <li>- butterfly insulating valves at inlet and outlet;</li> <li>- pressure safety valves at outlet;</li> <li>- manometers at inlet and outlet;</li> <li>- thermometers at inlet and outlet;</li> <li>- drainage valves.</li> </ul> <p>The equipment will be designed, manufactured, erected, tested, painted and commissioned as per Manufacturer Standard.</p>			
<b>Characteristics</b>			
<b>ITEM</b>		<b>B21WEX</b>	
Heat exchangers quantity	N°	1	
		<b>Hot water circuits</b>	<b>Cold water circuits</b>
Water flow-rate, each	m <sup>3</sup> /h	120	120
Process Inlet Temperature	°C	48	35
Process Outlet Temperature	°C	38	45
Pressure drop max.	bar	1.2	1.2
Design pressure	bar	10	
Plates material		Stainless steel (AISI316 0.5 mm thick)	
Gaskets type		Nitril rubber NBR	
Minimum extension capacity	%	10	
Frame plate		Carbon steel	
Upper and lower carrying bars		Carbon steel	



**6.1.3.4 Emergency tank**

<b>Emergency tank</b>		
<b>Components:</b>		
A – Electromagnetic pump	B – Supporting structure (not supplied)	
<b>General Features</b>		
<b>Technical description:</b>		
<p>The emergency tanks are provided to store water to be used during emergency case for backup cooling.</p> <p>The water content is calculated according the process minimum requests, considering both flowrate and time.</p> <p>Level switches control the level of the water and send a signal of low status to the PLC.</p> <p>The tanks will be installed on a platform/supporting structure not included in the supply (+35 m).</p> <p>The equipment will be designed, manufactured, erected, tested, painted and commissioned as per Manufacturer Standard.</p>		
		
<b>Characteristics</b>		
<b>ITEM</b>		<b>B03WEM</b>
<b>Quantity</b>	<b>N°</b>	1
<b>Capacity</b>	<b>m<sup>3</sup></b>	20
<b>Pressurization</b>		Atmospheric
<b>Media to be stored</b>		Water
<b>Tank material</b>		Painting Carbon steel
<b>ITEM</b>		<b>A03WEM</b>
<b>Quantity</b>	<b>N°</b>	1
<b>Capacity</b>	<b>m<sup>3</sup></b>	50
<b>Pressurization</b>		<b>Atmospheric</b>
<b>Media to be stored</b>		Water
<b>Tank material</b>		Painting Carbon steel

**6.1.3.5 Storage tank**

<b>Storage tank</b>		
<p><b>Components:</b></p> <p>A – Storage Tank            B – Instrumentation and Valves            C – Counter flanges            D – Inspection manhole</p>		
<b>General features</b>		
<p>The storage tank is foreseen to store water.</p> <p>The water content is calculated according the process minimum requests, considering both flowrate and time.</p> <p>Level switches control the level of the water and send a signal of low status to the PLC.</p> <p>The equipment will be designed, manufactured, erected, tested, painted and commissioned as per Manufacturer Standard.</p>		
<b>Characteristics</b>		
<b>ITEM</b>		<b>B01WTK</b>
<b>Storage tank quantity</b>	<b>N°</b>	1
<b>Net Capacity</b>	<b>m<sup>3</sup></b>	40
<b>Storage product</b>		Water
<b>Working Pressure</b>	<b>bar</b>	Atmospheric
<b>Tank material</b>		FRP

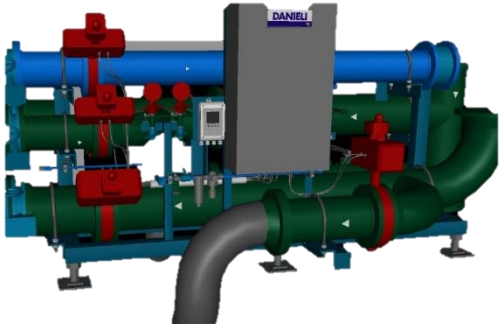
**6.1.3.6 Sand Filters**

<b>Pressure Filters (Danfilters®)</b>			
<b>Components:</b>			
A – Body			
B – Drainage nozzles system			
C – Accessories & instrumentation			
D – Quartz sand			
<b>General features</b>			
<b>Technical description</b>			
Vertical pressure filters (down-flow) are deep mono-media bed type.			
Danfilters® are specially designed for very high filtering rates, with optimum quality effluent and long operational time, according to international patent WO 2008049833 A2.			
A false bottom plate, complete with polypropylene long tang diffuser drainage PP nozzles, provides accurate flow distribution, avoiding preferential channels formation and assuring an effective distribution of backwash air.			
The filters are provided with:			
<ul style="list-style-type: none"> <li>- inlet/outlet manometers;</li> <li>- pneumatic service valves, complete with pilot solenoid valves;</li> <li>- flow meter for the measurement of the instant flow at outlet;</li> <li>- differential manometer (one for the battery);</li> <li>- automatic vent valve.</li> </ul>			
The filtration cycle can be interrupted by:			
<ul style="list-style-type: none"> <li>- time lapses, typically 24 hours;</li> <li>- differential pressure set point;</li> <li>- manually.</li> </ul>			
The backwashing phases are:			
<ol style="list-style-type: none"> <li>1. partial drainage;</li> <li>2. air-water backwash;</li> <li>3. water backwash;</li> <li>4. final rinse.</li> </ol>			
The equipment will be designed, manufactured, erected, tested, painted and commissioned as per Manufacturer Standard.			
<b>ITEM</b>		<b>C81WFS</b>	<b>A04WFS</b>
Pressure filters quantity	N°	2+1	1
Total water flow-rate	m <sup>3</sup> /h	850	350
Filtering speed	m/h	53	44
Filtering degree	µm	50	50
Diameter of cylindrical body	mm	3200	3200
Filtering area	m <sup>2</sup>	8	8
Filtering material		QS	QS
Construction material		Carbon steel	
Design code		Refer to section 2, point 1.1.2. "Design codes"	

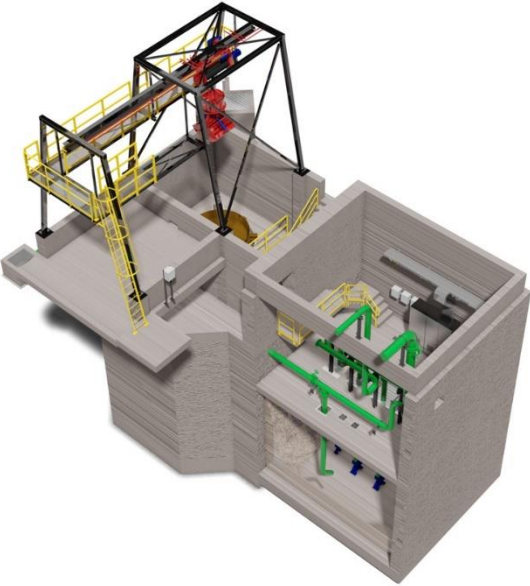

**LEGEND**

Quartz sand	QS
Quartz sand and Anthracite	QSA
Active Carbon	AC

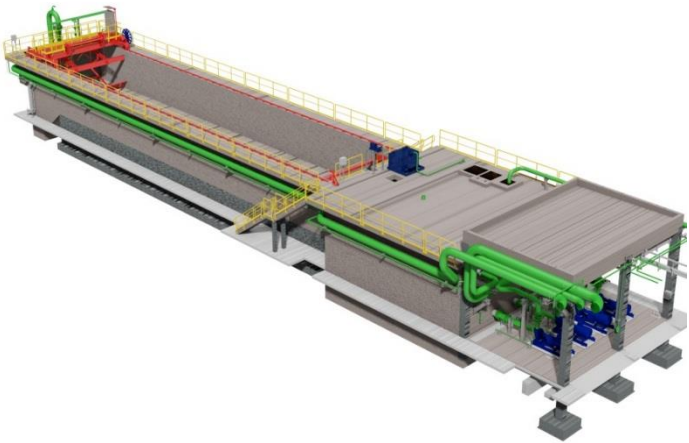
**6.1.3.7 Skid for filters**

<b>Skid for Pressure Filters (Danfilters®)</b>	
<b>Components:</b> A – Frame in carbon steel B – Valves & piping C – Accessories & instrumentation D – Junction box	
<b>General features</b>	
<b>Technical description:</b> One skid mounted system for each sand filter. All pneumatic valves, the flow transmitter, the manometers will be located on skid equipped with the carbon steel piping.  All instruments will be connected to a local junction/Q-box  The skid is tested before to deliver. Erection activity will be reduced as from main header the pipe has to be connected only to the flanges on skid.	
	
<b>Characteristics</b>	
<b>ITEM</b>	<b>C81WFS</b>
<b>Skids for pressure filters quantity</b> N°	3
<b>ITEM</b>	<b>A04WFS</b>
<b>Skids for pressure filters quantity</b> N°	1


**6.1.3.8 Scale Pit**

<b>Circular Scale pit</b>		
<b>Components:</b>		
A – Scale pit B – Carbon steel technological structures C – Oil skimmer D – Electrical monorail hoist E – Submergible Mechanical grab bucket		
<b>General features</b>		
<b>Technical description:</b>		
<p>The Daniemi special design allows the maximum scale separation efficiency, with the most reliable easy-to-manage system maintenance.</p> <p>Carbon steel technological structures are:</p> <ul style="list-style-type: none"> <li>- carbon steel feeding pipe with flanges</li> <li>- carbon steel central stilling pipe</li> <li>- serrated beam for decanted water overflow, in carbon steel</li> </ul> <p>All elements are perfectly integrated one each other, in order to reach maximum efficiency. The scale water coming from contact cooling circuits flows in the open concrete channel and is connected to the carbon steel-feeding pipe. This pipe drives the scale water to the carbon steel vertical central stilling pipe where scale water loses its turbulence and goes down to the bottom of scale pit.</p> <p>At the end of the central stilling pipe, the water flow changes its movement direction and goes up to the peripheral overflow weir. The scale particles drop down to the pit bottom, by gravity.</p> <p>Partially cleaned water overflows in the adjacent pumps pit, where an oil skimmer is installed to remove oil from water and collect it in an adjacent drum. Clarified water is pumped out by means of submersible pumps. Periodically, a submergible grab bucket supported by a hoisting system is used to automatically remove the scale collected in the pit bottom. The scale is discharged above ground into a drainage dump-box area or directly on a truck.</p>		
		
<b>Characteristics</b>		
<b>ITEM</b>		<b>C51WSP</b>
Scale pit water flow-rate	m <sup>3</sup> /h	356
Internal diameter	m	7
Pumps pit volume	m <sup>3</sup>	85


**6.1.3.9 Longitudinal Clarifier**

<b>Longitudinal clarifier</b>		
<p><b>Components:</b></p> <p>A – Concrete longitudinal basin            B – Trucks and blade lifting units            C – Bridge + other steel technological structures            D – Railways and fixing devices            E – Oil skimmer            F – Electrical hoist            G – Submergible bucket</p>		
<b>General features</b>		
<p><b>Technical description:</b></p> <p>The concrete longitudinal basin is designed to remove the remaining fine scale and oil from the water coming from the process. The water is discharged into the distribution chamber, located in the first part of the settler, from where the water is uniformly distributed into the basin. Water moves very slowly towards the outlet of the basin and allowing fine particles to settle on the bottom while the oil &amp; grease reaches the surface. The bottom blades of the scraper bridge, moving across the lane, collects the sludge in the scale collecting pit located in the first part of the settler.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="width: 45%;"> <p>A sludge dumping box (concrete made), is provided close to the clarifier to temporarily store the sludge unloaded by the bucket. Moreover the oil-skimming blade, fitted in the scraper bridge, moves floated oil towards the trap area placed at the end of the basin. Here, an oil skimmer device removes collected oil &amp; grease from the water surface.</p> </div> <div style="width: 45%; text-align: center;">  </div> </div> <p><b>Longitudinal clarifier is fitted with:</b></p> <ul style="list-style-type: none"> <li>- oil skimmer</li> <li>- hoist + supporting structure</li> <li>- submergible controlled bucket</li> <li>- scraper bridge</li> </ul>		
<b>Characteristics</b>		
<b>ITEM</b>		<b>C81WTR</b>
Mobile scraper bridge quantity	N°	1
Number of lanes	N°	1
Total water flow-rate	m <sup>3</sup> /h	850
Terminal velocity	m/h	~3.5
Dimensions (w x l)	m	6x40


**6.1.3.10 Grab Bucket**

<b>Grab Bucket</b>			
<b>Components:</b>			
A – Electro-hydraulic unit B – Hydraulic cylinders C – Jaws			
<b>General features</b>			
<b>Technical description</b>			
The electro-hydraulic grab bucket is used to evacuate the scale from the settling basins.			
A submersible electro-hydraulic unit, installed on the top of the bucket, provides the opening and closing movements of the jaws. The motor is reversible type.			
The grab bucket is provided with lateral hoses to allow the drainage of the water during the scale collection phase.			
The equipment will be designed, manufactured, erected, tested, painted and commissioned as per Manufacturer Standard.			
<b>Characteristics</b>			
<b>ITEM</b>		<b>C51WBK</b>	<b>C81WBK</b>
Motor power	kW	7.5	7.5
Capacity (waterline)	m <sup>3</sup>	0.35	0.35
Capacity (30° dome)	m <sup>3</sup>	0.5	0.5
Mechanical take-over point		Rigid link on the bucket casing	

**6.1.3.11 Hoist**

<b>Hoist</b>			
<p><b>Components:</b></p> <p>A – Hoist            B – Hook            C – Drag trolley            D – Cable trolley            E – Motors            F – Pendant pushbutton</p>			
<p><b>Technical description</b></p> <p>The hoist operates in manual or automatic mode for scale collection and discharge. It is installed on a supporting structure, above the working area.</p> <p>The hoist is provided with a cable drum, spring type, to rewind the cable to feed the bucket.</p> <p>The translation and lifting / lowering positions are defined by limit switches. All the sequences of the hoist bucket group (translation, lifting, lowering, and charging) is controlled by centralised PLC. Local pushbutton is provided for local operations.</p> <p>The equipment will be designed, manufactured, erected, tested, painted and commissioned as per Manufacturer Standard.</p>			
<b>Characteristics</b>			
<b>ITEM</b>		<b>C51WHS</b>	<b>C81WHS</b>
Capacity max	ton	3.2	3.2
Hook stroke	m	20	14
Reeving		4/2	4/2
Class		FEM M5	FEM M5
Lifting speed	m/min	8	8
Trolley speed	m/min	16	16
Lifting motor power	kW	4.5	4.5
Translation motor power	kW	0.25	0.25
Electric protection		IP 55	IP 55
Ropes		Anti-twist type	Anti-twist type


**6.1.3.12 Oil Skimmer**

<b>Belt Oil skimmer</b>			
<b>Components</b>			
A – Belt B – Motor C – Frame			
<b>General features</b>			
<p><b>Technical description</b></p> <p>As the steel belt passes over the water surface, oil adheres to it and water is repelled.</p> <p>The oil-covered belt is then drawn up through the scrapers, where the oil is removed and collected into an adjacent drum. Clean belt is returned to the water to gather more oil.</p> <p>The oil falls into a reservoir and flows into a collection system.</p> <p>The skimmer is mounted on structural steel framing at the side of the pit, above the surface at a height convenient for a gravity oil discharge, accessible for service and out of the way of pit operations.</p> <p>The belt collector is made of stainless steel material, resistant to oil and grease, to abrasion and to high temperatures.</p> <p>The skimmer parts in contact with the belt, including the scrapers, pressure block, belt guide, drive wheel and drive wheel fingers, are made of abrasion-resistant material. A wind guard/safety cover protects the wheels.</p> <p>A suitable motor for indoor or outdoor installation drives the oil skimmer.</p>			
<b>Characteristics</b>			
ITEM		<b>C51WSK</b>	<b>C81WSK</b>
Maximum capacity	l/h	100	100
Residual water content	%	5	5
Motor	kW	0,37	0,37


**6.1.3.13 Sludge Thickener**

<b>Sludge Thickener</b>		
<b>Components:</b>		
A – Drive head unit		D – Bottom support
B – Adjustable toothed weirs		E – Scum collecting system
C – Bottom scrapers		F – Torque control
<b>General features</b>		
<p>Technical description:</p> <p>The sludge thickener is designed to collect, settle and thicken the dirty water coming from the backwash of all the filtering groups installed in the water treatment plant.</p> <p>Then it overflows into a central vertical pipe where water loses its turbulence and is distributed to the settling circular pit. Flocks settle in the tapered bottom and are collected by the scraper blades of the mobile bridge toward the central bottom.</p> <p>The sludge water is collected by gravity to flash mixing pit, where a proper flocculant is added.</p> <p>Oil skimming blade of the mobile bridge collects and discharges oil in a drum nearby.</p> <p>A special load cell, mounted on the drive head of the mobile bridge, measures the sludge thickening.</p> <p>When the load value reaches the pre-set figure, the automatic discharge cycle starts.</p> <p>A pumping station discharges the thickened sludge.</p> <p>Structures and tapered bottom are made in concrete.</p> <p>Overflow of clean water suitable for re-circulating is collected in the cooling tower basin through gravity.</p> <p>The equipment will be designed, manufactured, erected, tested, painted and commissioned as per Manufacturer Standard.</p>		
		
<b>Characteristics</b>		
<b>ITEM</b>		<b>F11WTH</b>
Mobile bridge quantity	N°	1
Basin inside diameter	m	4.9
Thickened sludge concentration	%	10
Underflow pumps	N°	1+1
Scraping trestle and relevant arms		Painted carbon steel
Tapered bottom and walls material		Concrete
Bridge material		Concrete

**6.1.3.14 Blower**

<b>Blowers</b>		
<b>Components:</b>		
A – Motor		E – Baseplate
B – Shaft Seal		F – Coult
C – Rotors		
D – Inlet Filter		
<b>General features</b>		
<b>Technical description</b>		
<p>Blower supplies compressed air for cleaning of the filtration battery.            Blower has mated profile rotors with twin lobes, which rotate inside a properly shaped casing.            Special gears located on the shaft mutually synchronize the movement of the rotors; hence there is no friction between rotors &amp; casing.</p> <p>The blowers &amp; the lubrication oil are cooled by the natural convection. The bearings &amp; synchronism gear are lubricated by oil splashing.</p> <p>A silencer is foreseen to guarantee a low level of noise.</p> <p>Labyrinth seal on the shaft assures sealing of the conveyed air; these seals ensure that the air is conveyed oil free.</p> <p>Blower is automatically started &amp; controlled by PLC according to the backwashing cycle of the filters.</p> <p>The equipment will be designed, manufactures, erected, tested, painted &amp; commissioned as per Manufacturer Standard.</p>		
		
<b>Characteristics</b>		
ITEM		F01WBF
Quantity	Nos.	1
Air flow rate	Nm3/h	600
Pressure increase	bar	0.8
Motor Rating	kW	30
Motor		AC 3 phase motor
Sound level at 1 m of distance	dB(A)	<85 with cowl

**6.1.3.15 Softener package**

<b>Softener Plant</b>		
<b>Components:</b>		
A – Ionic exchange columns		C – Ionic exchange columns
B – Pumps for regeneration		D – Pumps for regeneration
<b>General features</b>		
<p>The softening plant package provides to reduce the water hardness content. The process consists in replacing, by means of ion-exchange resins regenerated in sodium cycle, the calcium and magnesium content in the water, with the corresponding sodium salts. The exhausted resin is regenerated with a sodium chloride solution, previously prepared in the brine tank. A pumping station, located in the brine tank feeds this solution, and sends it into the columns, from top to the bottom and then discharged through the drain. The columns are made in fiberglass; each column contains the required quantity of resin in accordance with the plant capacity. Once the resin is exhausted, the service cycle starts and the plant will automatically enter into regeneration, so as to restore the initial operating conditions. The equipment will be designed, manufactured, erected, tested, painted and commissioned as per Manufacturer Standard.</p>		
<b>Characteristics</b>		
ITEM		G42WFS
Columns quantity	N°	1
Water flow (each columns)	m³/h	10
Softened water residual hardness)	ppm CaCO <sub>3</sub>	≤ 5
Brine concentration	%	26
Solution tank material		PE
Columns material		FRP
Regeneration pump quantity	N°	1+1

**6.1.3.16 Dewatering System Package (Press Filter)**

<b>Press filter</b>		
<b>Components:</b>		
A – Sludge feeding pump		A – Sludge feeding pump
B – Supporting steel structure		B – Supporting steel structure
C – Filtering membranes		C – Filtering membranes
<b>General features</b>		
<b>Technical description:</b>		
<p>The automatic filter press consists of a frame that acts as a support to the filter plates, their separation and closing system, control devices and the feed pump.</p> <p>The main component of the filter is the filtration pack formed by plates and cloths.</p> <p>Filtration is performed pressing together the plates and the cloths between the movable pressure head.</p> <p>The liquid to be filtered is delivered by the high-pressure pumps inside the cloths through the plate's holes to provide the filter feeding.</p>		
<p>After filtration process the liquid part is carried out under pressure while the solid part deposits on the cloths forming the sludge "panel".</p> <p>When the filtration cycle is over the sludge discharge takes place separating all the plates one by one, thus allowing the panel to be removed falling down into the collecting area.</p> <p>After sludge panel removal the filtering cycle restarts.</p> <p>The automation of the filter is controlled by a local control panel and gives the possibility to check all the functional parameters.</p> <p>The equipment will be designed, manufactured, erected, tested, painted and commissioned as per Manufacturer Standard.</p>		
<b>Characteristics</b>		
ITEM		F32WBP
<b>Quantity</b>	<b>N°</b>	1
<b>Process slurry flow-rate</b>	<b>gpm</b>	~3
<b>Inlet dry solid content</b>	<b>%</b>	10 ÷ 15
<b>Outlet dry solid content</b>	<b>%</b>	45 ÷ 65
<b>Installed power</b>	<b>kW</b>	15

### **6.1.1. PIPING AND VALVES**

#### **Technical description**

1) Piping distribution is designed according to Danieli General Specification GS-P-01. Piping material is provided in accordance with Danieli Piping System Material (PSM), developed according to standards as indicated at point 1.1.2. "Design code"

All networks are in carbon steel, unless otherwise specified.

Fabrication, assembly, painting and coating of piping systems will be carried out during erection at site and are considered as part of erection work.

Isometric drawings for pre-assembling activities and painting material for piping will be at erection company charge.

All check and butterfly valves will be wafer type.

Danieli standard components for piping system could be modified during engineering phases, according to good engineering practice.

2) The pumping stations are provided with a distribution manifold with flanged stub pipes to each pump.

Each horizontal pump is equipped with:

- strainer (or bell with protection grid) and butterfly valve on suction;
- butterfly and check valves on discharge;
- flexible coupling on suction only;
- manometers with valve;
- drainage valves on suction and discharge side.

Each submersible pump is equipped with:

- butterfly and check valves on discharge;
- manometer with valve;
- drainage valves on discharge side.

Each blower is equipped with:

- base for coupling to electric motor
- check valve
- safety valve
- manometer
- intake air filter
- anti-vibration supports
- anti-vibration joints

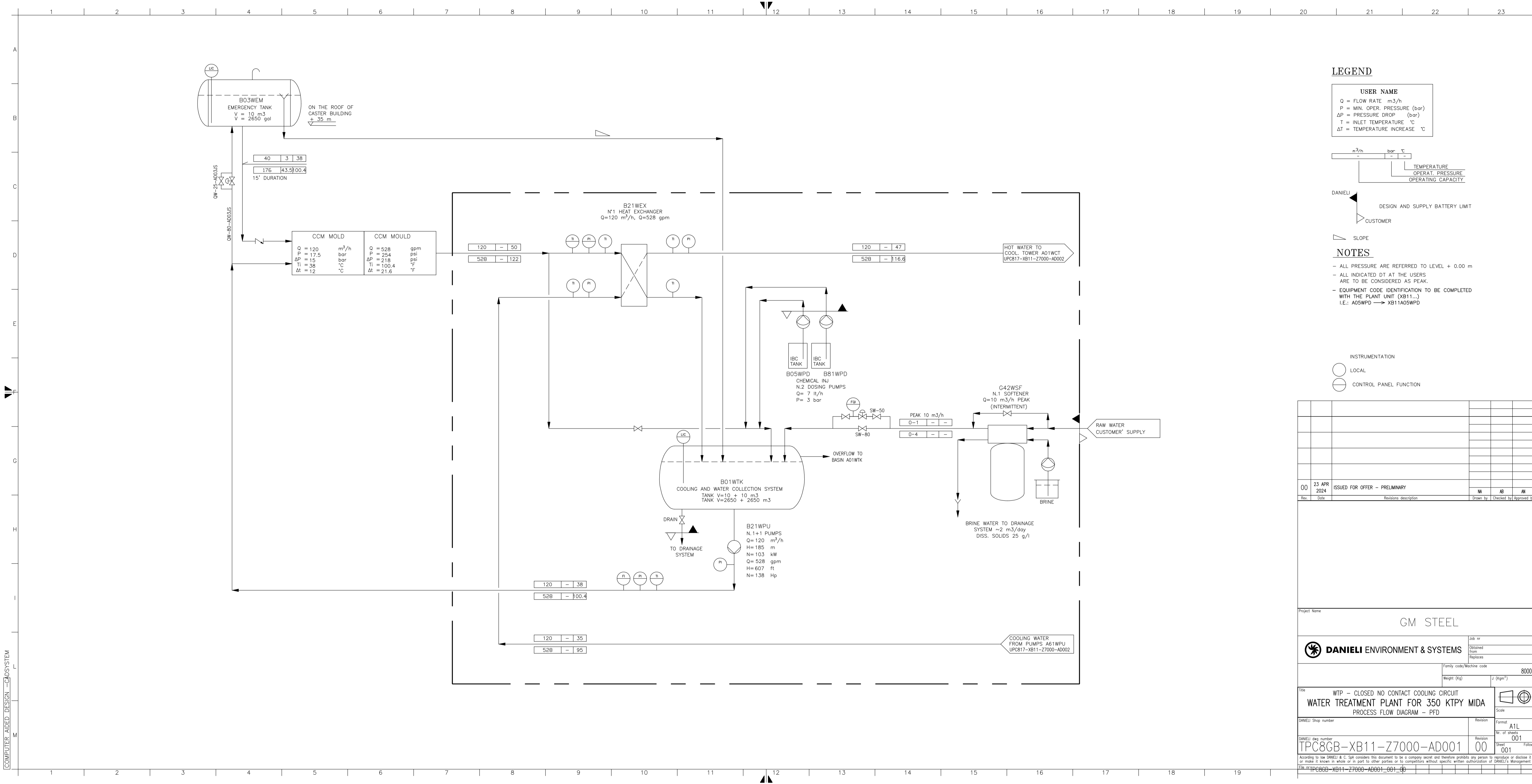
**6.1.2. INSTRUMENTATION**

<b>Instrumentation: field sensors</b>		<b>Components</b>
<b>Location</b>	Water Treatment Plant	A – Temperature sensors B – Pressure sensors C – Flow sensors D – Level sensors E – Analysis sensors
<b>Duty</b>		
All circuits		
<b>General features</b>		
Identification letters and symbols for instrument control diagrams shall be in accordance with ISA S 5.1 standard. The complete Instrument list will be defined during detail engineering. Technical characteristics of the instruments that could be used are illustrated here below:		
<b>Characteristics of temperature sensors</b>		
<b>Temperature gauge</b>		
Type	liquid or gas filled/bimetallic	
Dial	DN 100	
Scale ranges	According to process requirements	
Accuracy	class 1 DIN 16203	
Protection	degree IP 55 min	
<b>Temperature switch</b>		
Type	liquid or gas filled/bimetallic	
Protection degree	IP 55	
Contact	2A, 250 VAC	
<b>Resistance thermal detector (RTD) and temperature transmitters</b>		
Type	Pt 100 3 wires / Pt 100	
Accuracy	Class A	
Insulation	MgO compact	
Material	Stainless steel	
Output (for transmitters)	4-20 mA 2 wires (24 VDC)	

<b>Characteristics of pressure sensors</b>	
<b>Pressure and differential pressure gauge</b>	
Type	bellow/diaphragm
Dial	∅ 100÷160
Protection degree	IP55 min
Connection	1/2"
Scale ranges	EN 837
Accuracy	class 1 EN 837 (pressure without filling) class 1.6 EN 837 (differential pressure or filled instruments)
Limit contacts	When required
<b>Pressure and differential pressure switch</b>	
Type	bellow/diaphragm
Protection degree	IP55
Contact	2A - 250VAC
<b>Pressure and differential pressure transmitter</b>	
Type	capacity or inductive cell
Protection degree	IP65
Rangeability	min. 10:1
Output	4-20 mA – 2 wire (24 VDC)
Accuracy	± 0.2 %
Adjustment	zero-span-damping
<b>Characteristics of flow sensors</b>	
<b>Flow indicator</b>	
Type	variable area with local indication
Protection degree	IP 65
Connection	Flanged
Accuracy	± 5 %
Additional devices magnetic switch	magnetic 1A/250 VAC (when required)
<b>Flow transmitter</b>	
Type	magnetic / ultrasonic
Protection degree	IP 65
Accuracy	± 1 %/± 1.5 %
Rangeability	15:1/4:1
Output	4-20 mA
Power supply	220 VAC / 24 VDC / 220 B
Adjustment	zero-span-damping
Connection	flanged / wafer
Additional built in meter	(when required)
General Selection criteria	Magnetic: for pipe DN ≤ 400 Ultrasonic: for pipe DN > 400

<b>Characteristics of level sensors</b>	
<b>Level gauge</b>	
Type	magnetic
Protection degree	IP65
Connection	Flanged
Switches	If required
Mounting	direct (external side)
<b>Level switch</b>	
Type	float
Protection degree	IP55
Output	1 A / 250 VAC min
Setting point	fixed / adjustable
<b>Level transmitter</b>	
Type	Dp-cell / Ultrasonic / Radar
Protection degree	IP 65
Output	4 ÷ 20 mA
Power supply	220 VAC / 24 VDC
Adjustment	Zero – span
Additional built-in meter	(when required)
Connection	Threaded/flanged
<b>Characteristics of analysis sensors</b>	
<b>Conductivity transmitter</b>	
Range	0-5000 $\mu$ S
Output	4-20 mA
Power supply	220 VAC / 110 AC
Adjustment	Zero – span
Additional built in meter	(when required)
Limit contacts	(when required)

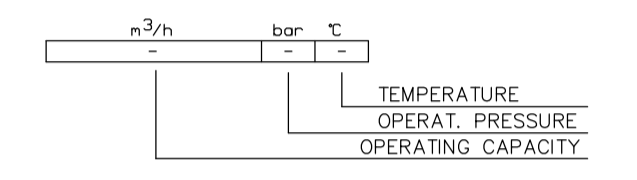
<b>Valves and dampers</b>		<b>Type</b>
<b>Location /</b>	Water Treatment Plant	A – Solenoid valves B – On/off control valves C – Control valves
<b>Duty</b>		
All circuits		
<b>General features</b>		
Identification letters and symbols for instrument control diagrams shall be in accordance with ISA S 5.1 standard.		
Technical characteristics of the instruments that can be used are illustrated here below:		
<b>Solenoid type</b>		
<b>Characteristics</b>		
Actuator	single/double coil	
Supply	24 VDC	
Protection degree	IP54	
Body	PN10-PN16	
Ways	2-5	
Connection	threaded/flanged for direct installed on actuator	
<b>On/off control valves</b>		
<b>Characteristics</b>		
Type	ball/butterfly/pinch / Diaphragm	
Connection	flanged /wafer	
Actuator pneumatic type	Cylinder	
- air supply	6 bar max	
- additional devices	limit switches (when required)	
<b>Control valves</b>		
<b>Characteristics</b>		
Type	Globe / ball/ Eccentric plug	
Connection	flanged /wafer	
Actuator pneumatic type	Diaphragm	
- air supply	6 bar max	
- additional devices	limit switches (when required) Positioner.	



**LEGEND**

USER NAME

Q = FLOW RATE m<sup>3</sup>/h  
P = MIN. OPER. PRESSURE (bar)  
ΔP = PRESSURE DROP (bar)  
T = INLET TEMPERATURE °C  
ΔT = TEMPERATURE INCREASE °C



DANIELI DESIGN AND SUPPLY BATTERY LIMIT

CUSTOMER

SLOPE

**NOTES**

- ALL PRESSURE ARE REFERRED TO LEVEL + 0.00 m
- ALL INDICATED DT AT THE USERS ARE TO BE CONSIDERED AS PEAK
- EQUIPMENT CODE IDENTIFICATION TO BE COMPLETED WITH THE PLANT UNIT (XB11...)
- I.E.: A05WPD → XB11A05WPD

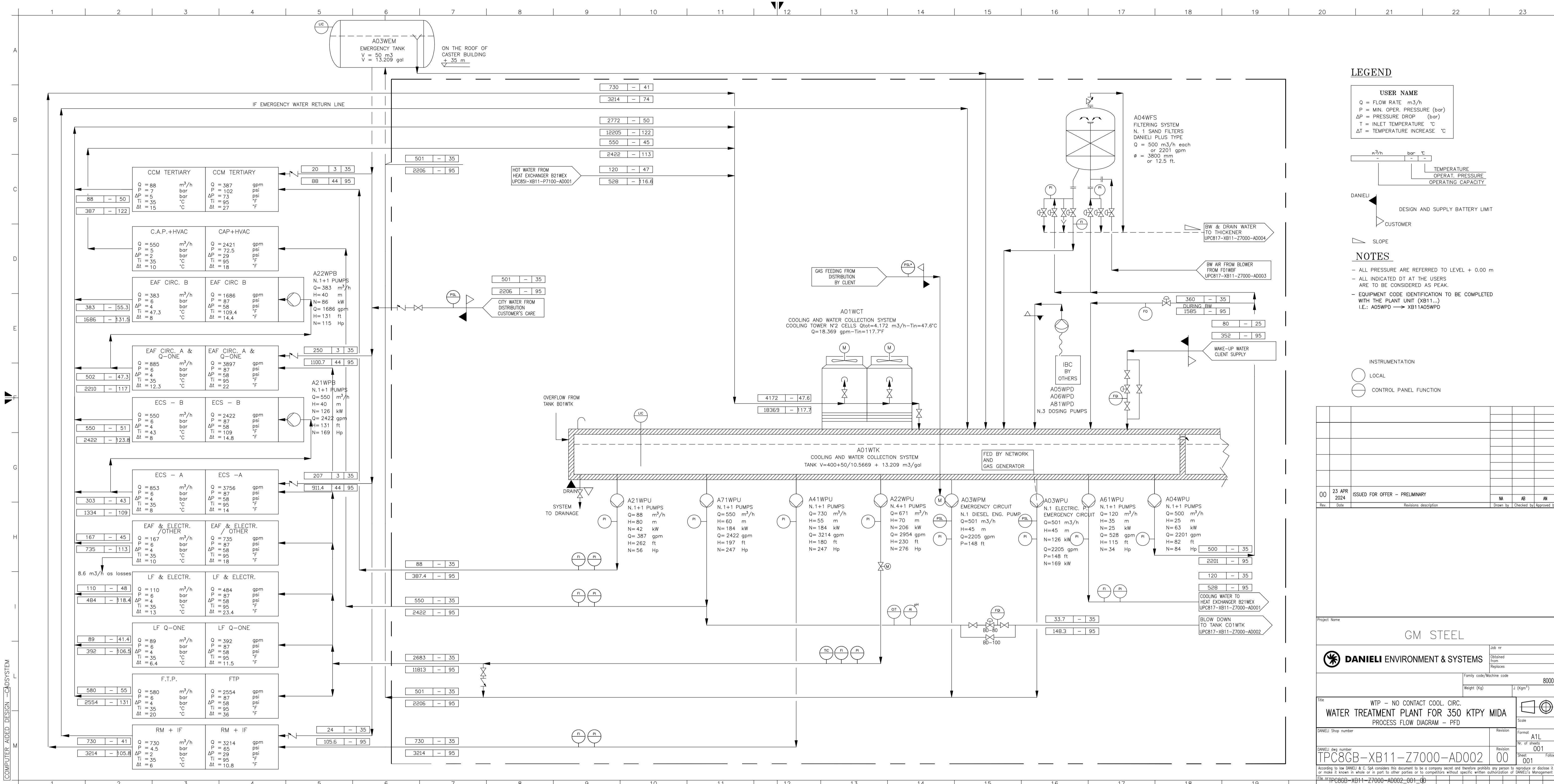
**INSTRUMENTATION**

LOCAL

CONTROL PANEL FUNCTION

00	23 APR 2024	ISSUED FOR OFFER - PRELIMINARY	MA	JB	AN
Rev.	Date	Revisions description	Drawn by	Checked by	Approved by
Project Name: GM STEEL					
DANIELI ENVIRONMENT & SYSTEMS					
Job nr					
Obtained from					
Replaces					
Family code/Machine code: 8000					
Weight (Kg)					
j (Kg/m <sup>3</sup> )					
Title: WTP - CLOSED NO CONTACT COOLING CIRCUIT WATER TREATMENT PLANT FOR 350 KTPY MIDA PROCESS FLOW DIAGRAM - PFD					
Scale					
DANIELI Shop number					
Revision: A1L					
Form: 001					
N. of sheets					
DANIELI design number: TPC8GB-XB11-Z7000-AD001					
Revision: 00					
Sheet: 001					
Follow					
According to law DANIELI & C. SpA considers this document to be a company secret and therefore prohibits any person to reproduce or disclose it or make it known in whole or in part to other parties or to competitors without specific written authorization of DANIELI's Management.					
File: TPC8GB-XB11-Z7000-AD001-001-00					

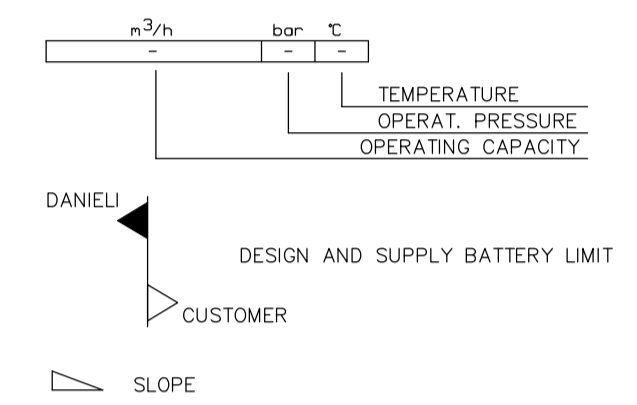
COMPUTER AIDED DESIGN - CAD SYSTEM



**LEGEND**

**USER NAME**

Q = FLOW RATE m<sup>3</sup>/h  
P = MIN. OPER. PRESSURE (bar)  
ΔP = PRESSURE DROP (bar)  
T = INLET TEMPERATURE °C  
ΔT = TEMPERATURE INCREASE °C



**NOTES**

- ALL PRESSURE ARE REFERRED TO LEVEL + 0.00 m
- ALL INDICATED ΔT AT THE USERS ARE TO BE CONSIDERED AS PEAK.
- EQUIPMENT CODE IDENTIFICATION TO BE COMPLETED WITH THE PLANT UNIT (XB11...)
- I.E.: A05WPD → XB11A05WPD

**INSTRUMENTATION**

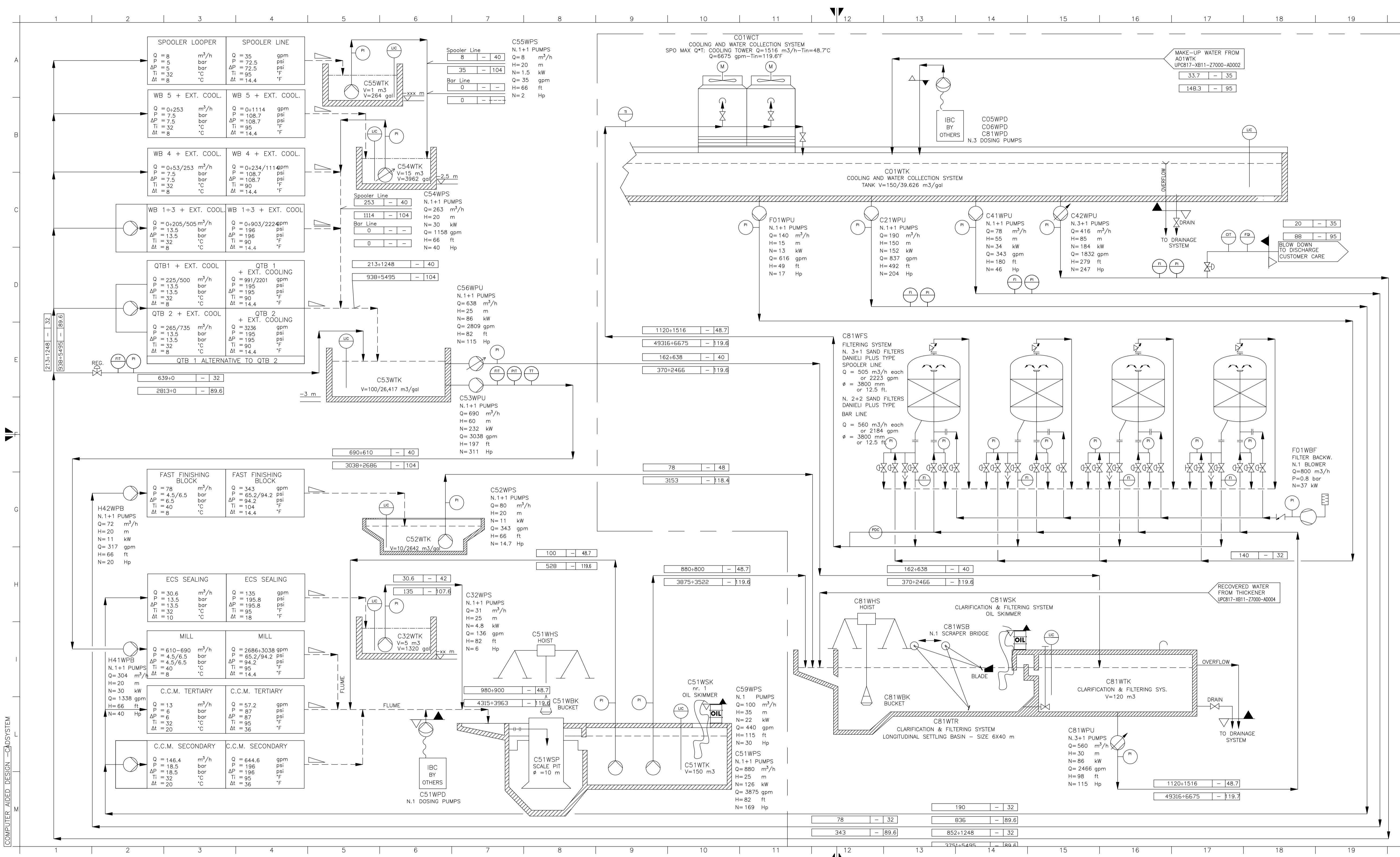
○ LOCAL  
○ CONTROL PANEL FUNCTION

Rev.	Date	Revisions description	Drawn by	Checked by	Approved by
00	23 APR 2024	ISSUED FOR OFFER - PRELIMINARY			

Project Name		GM STEEL	
Client		DANIELI ENVIRONMENT & SYSTEMS	
Job nr		Obtained from	
Family code/Machine code		8000	
Weight (kg)		i (kg/m <sup>3</sup> )	
Title		WTP - NO CONTACT COOL. CIRC. WATER TREATMENT PLANT FOR 350 KTPY MIDA PROCESS FLOW DIAGRAM - PFD	
DANIELI Shop number		Revision	
DANIELI Shop number		Revision	
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Scale		A1L	
No. of sheets		001	
Sheet		001	

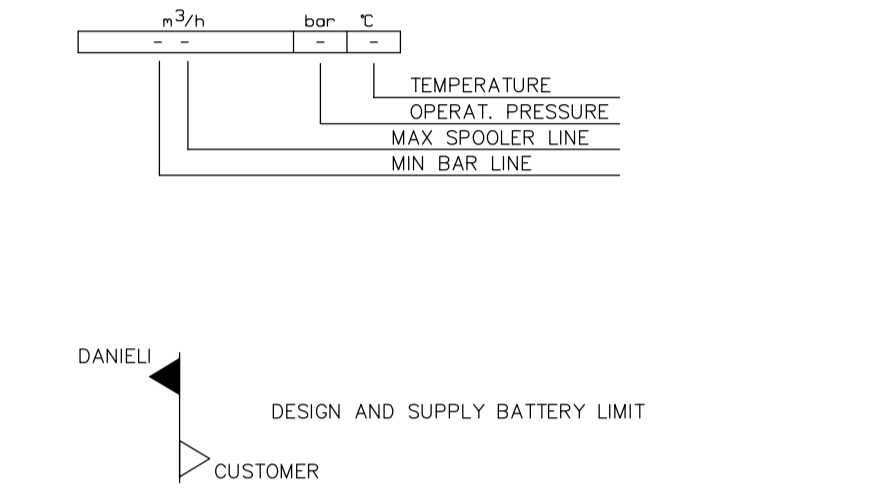
COMPUTER AIDED DESIGN - CADSYSTEM



**LEGEND**

**USER NAME**

Q = FLOW RATE m<sup>3</sup>/h  
P = MIN. OPER. PRESSURE (bar)  
ΔP = PRESSURE DROP (bar)  
T = INLET TEMPERATURE °C  
ΔT = TEMPERATURE INCREASE °C



**NOTES**

- ALL PRESSURE ARE REFERRED TO LEVEL + 0.00 m
- ALL INDICATED DT AT THE USERS ARE TO BE CONSIDERED AS PEAK.
- EQUIPMENT CODE IDENTIFICATION TO BE COMPLETED WITH THE PLANT UNIT (XB11...)
- I.E.: A05WDP → XB11A05WDP

**INSTRUMENTATION**

○ LOCAL  
○ CONTROL PANEL FUNCTION

00	23 APR 2024	ISSUED FOR OFFER - PRELIMINARY			
Rev.	Date	Revisions description	Drawn by	Checked by	Approved by

Project Name: **GM STEEL**

**DANIELI ENVIRONMENT & SYSTEMS**

Job no. [ ]  
Disciplin. [ ]  
Replaces [ ]

Family code/Machine code: [ ] 8000
Weight (kg) [ ] / (kg/m) [ ]

File: **WTP - OPEN CONTACT COOLING CIRCUIT**  
**WATER TREATMENT PLANT FOR 350 KTPY MIDA**  
**PROCESS FLOW DIAGRAM - PFD**

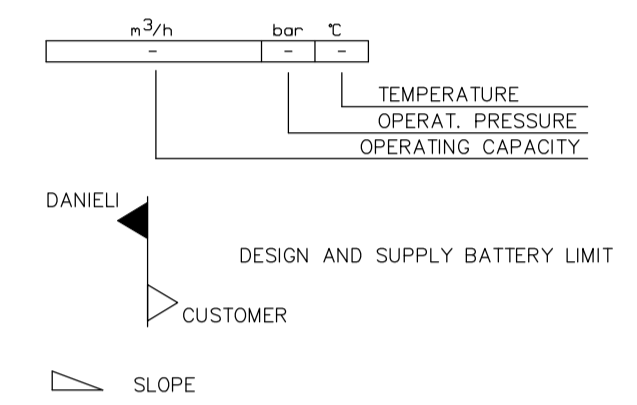
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No. of sheets: **001**  
Sheet: **001** Follow

File # TPC8GB-XB11-27000-AD003\_001\_00

COMPUTER AIDED DESIGN - CADSYSTEM

**LEGEND**

USER NAME  
 Q = FLOW RATE m<sup>3</sup>/h  
 P = MIN. OPER. PRESSURE (bar)  
 ΔP = PRESSURE DROP (bar)  
 T = INLET TEMPERATURE °C  
 ΔT = TEMPERATURE INCREASE °C

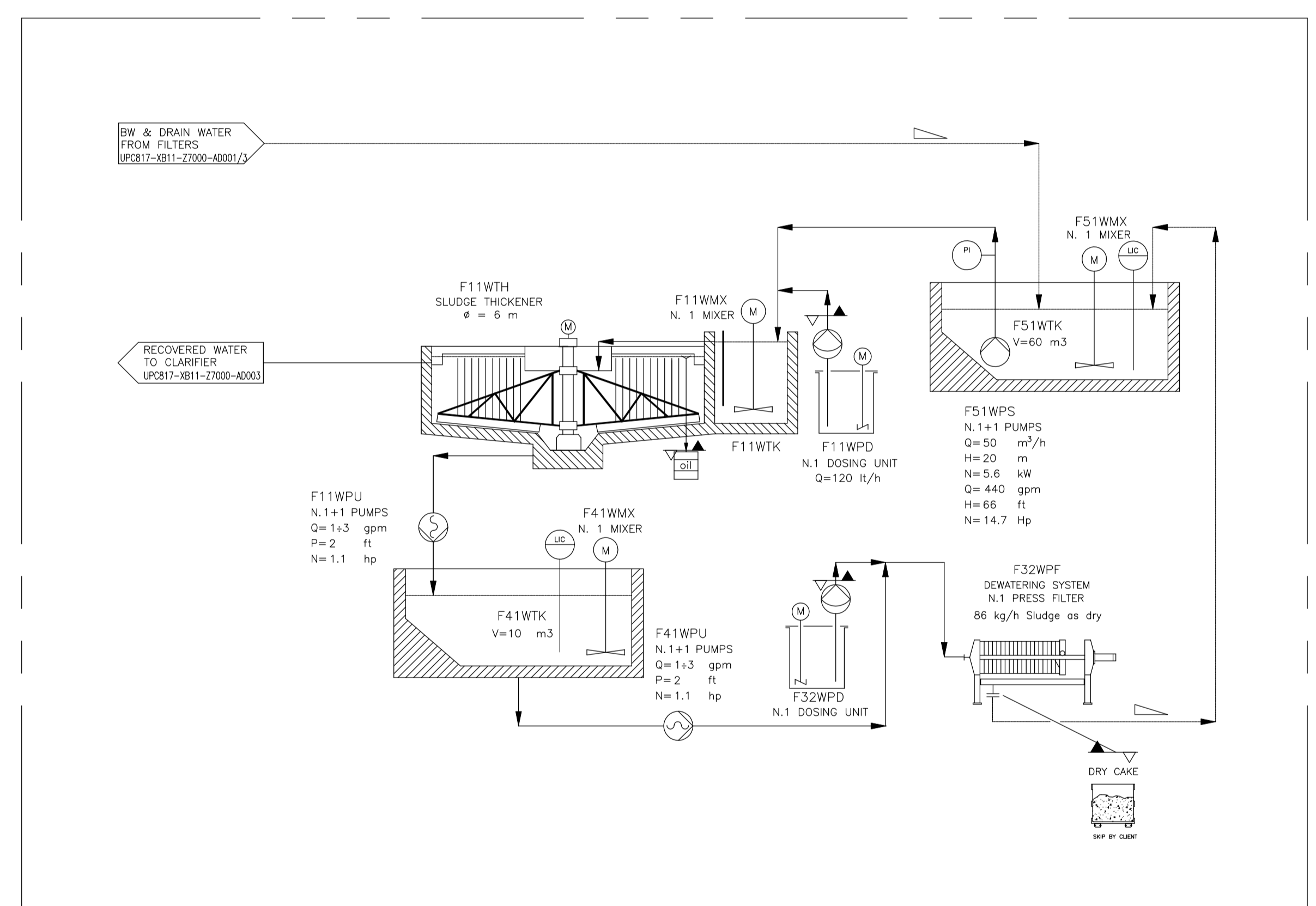


**NOTES**

- ALL PRESSURE ARE REFERRED TO LEVEL + 0.00 m
- ALL INDICATED DT AT THE USERS ARE TO BE CONSIDERED AS PEAK.
- EQUIPMENT CODE IDENTIFICATION TO BE COMPLETED WITH THE PLANT UNIT (XB11...)  
 I.E.: A05WPD → XB11A05WPD

**INSTRUMENTATION**

LOCAL  
 CONTROL PANEL FUNCTION



00	23 APR 2024	ISSUED FOR OFFER - PRELIMINARY	M	AB	M
Rev.	Date	Revisions description	Drawn by	Checked by	Approved by
Project Name <b>GM STEEL</b>					
		Job no.		Discarded from	
		Replaces			
Family code/Machine code			8000		
Weight (kg)			l (kg/m <sup>3</sup> )		
Title <b>WTP - SLUDGE TREATMENT WATER TREATMENT PLANT FOR 350 KTPY MIDA PROCESS FLOW DIAGRAM - PFD</b>					
DANIELI Shop number		Revision		Format	
TPC8CB-XB11-Z7000-AD004		00		ATL	
				Nr. of sheets	
				001	
				Sheet	
				001	
				Follow	
File # TPC8CB-XB11-Z7000-AD004_001_00					

## GM STEEL CHEMICAL STORAGE SUMMARY

Chemical	State	UN Number	ADG Code	Proposed Quantity	Mass (t)	WHS Reg Sch 15 Threshold (t)	10% of threshold for Hazardous Chemical Facility (t)	Threshold ratio
<b>Nitrogen gas</b>	Gas	1066	Class 2, Div 2.2	1 x 33000 litre tank	39.6	Not listed	NA	NA
<b>Argon gas</b>	Gas	1006	Class 2, Div 2.2	1 x 10000 litre tank	14	Not listed	NA	NA
<b>Oxygen gas (compressed oxygen not liquid oxygen)</b>	Gas	1072/1073	Class 2, Div 2.2 (5.1)	1 x 75000 litre (10 t) tank with on-demand delivery by 10 t tanker as required. A conservative 10% allowance for internal pipe network storage has also been made.	11	2000	200	0.0055
<b>Diesel</b>	Liquid	1202	Class 3, Div 2.1, PG 3	1 x 5000 litre tank	4.16	Not listed	NA	NA
<b>Liquefied natural gas</b>	Liquid	1972	Class 2, Div 2.2	1 x 15 t static tank (33 000 litre) tank with on-demand delivery by 10 t tanker when the static tank level is at 5 t or less. A conservative 10% allowance for internal pipe network storage has also been made.	16.5	200	20	0.083
<b>Aggregate ratio for all hazardous chemicals</b>								<b>0.0885</b>

## Appendix B Fume Treatment Plant Technical Specifications

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## Section 2.2

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### Design concept - Fume treatment plant

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## 2.2.1 Introduction

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This project concerns a fume de-dusting plant designed for the primary, secondary and auxiliary suction lines fumes of the **39 tons** tapped steel EAF according to process parameters shown in the Design Concept (EAF-LF sections).

The plant is designed to capture and treat the fumes of:

- > Primary fumes line from the ECS® outlet;
- > Secondary fumes line from the canopy hood arranged on the building roof over the furnace shell;
- > EAF Tapping Hood
- > Dynamic seal;
- > Ladle Furnace (LF) station.

This project includes also the basic design of a roof canopy hood above the furnace. Since the canopy hood is conceived as an extension of the building structure, it is considered being part of the building itself.

The data shown in this offer are preliminary. Should it be necessary, Danieli reserves the right to change them during the development of the project, with plant performance remaining unaltered.

Being the Fume Treatment Plants a complex system of ducts, its routing determines the characteristics of the Fans.

Due to this fact, significative variations of the preliminary routing could determine a recalculation of such characteristics, dimensioning of the machinery and parts of the FTP.

In the case that the preliminary or final layout will require modifications for reasons not attributable to the Seller, the overall timeline of the Fume Treatment Plant could be affected as well as the machinery and related power requirement could need to be resized with possible effects on costs.

---

## 2.2.2 Plant description

---

The fume plant is designed for the treatment of fumes produced during operation of the EAF (Electric Arc Furnace).

A water-cooled duct conveys the fumes sucked from the ECS® outlet to the settling chamber followed by another water-cooled duct.

After the water-cooled duct, the pre-treated fumes are conveyed to the main duct connecting the roof canopy hood to the filter plant.

Filtering is performed by a suction type filter design with bags. Cleaning of the bags is performed by means of compressed air injection (Pulse-Jet system).

The main fans installed at the bag filter clean side deliver the fume to the stack.

The plant is provided with a dust conveying system, which conveys the dust from the bag filter and the axial cyclone to the dust collecting system.

The proposed plant features the following:

- > Settling chamber for the settling of heavier particles contained in the primary fumes;
- > Very efficient bag cleaning system, which allows a high air-to-cloth ratio, resulting in compact equipment;
- > Cyclone as spark arrestor to protect the bags of the filter;
- > Suction design (negative pressure) used for the bag filter, no dust leakage underneath the filter hoppers (Pulse Jet type filter);
- > Bag changing is performed from the top of the filter, on the clean side; there is no need for workers to operate inside the bag filter;
- > Main fans are installed on the clean side of the bag filter, which allows the use of high efficiency airfoil backward vane impellers, resulting in low energy consumption;
- > Booster fan for some auxiliary suction lines to ensure the suction in any plant operating condition;
- > High consideration has been given to the environment inside the EAF bay, sizing the secondary suction as well as the Bag filter in order to provide the necessary ventilation and heat removal from the EAF area.

---

## 2.2.3 Process description

---

### 2.2.3.1 Primary fumes suction

The fumes are sucked from the ECS<sup>®</sup> outlet through a water-cooled duct.

A settling chamber is installed near the ECS<sup>®</sup> outlet and designed to collect pieces of light scrap and coarse dust sucked from the ECS<sup>®</sup>.

The settled material can be easily removed through a water-cooled door, by means of a small front-end loader.

The primary fumes are mixed with the secondary fumes sucked from the canopy hood over the furnace and then conveyed to the bag filter.

### 2.2.3.2 Primary fumes conveying

The primary fumes are collected by means of a water-cooled duct connected to the settling chamber.

After the settling chamber, there is another water-cooled duct for a further cooling of the primary fumes, and when the temperature of the hot fumes is cooled down to a temperature in compliance with the downstream single-wall duct, the water-cooled duct ends.

All water-cooled components, such as settling and post-combustion chamber and water-cooled ducts are provided with walls having a pipe-to-pipe water-cooled design.



**Water-cooled duct**

**Section 2.2 / Design concept - Fume treatment plant****2.2.3 Process description****2.2.3.3 Primary fumes cooling and mixing**

The primary fumes extracted from the ECS® outlet are mixed with the secondary fumes coming from the canopy hood.

Downstream of the water-cooled duct there is an electrically driven damper, that can be used to adjust the flow rate of primary fumes according to the requirements of the EAF process cycle.

An emergency damper, installed downstream of the fumes mixing point, is used to protect the filter bags against the risk of overheating due to the malfunctioning of the control system of the other dampers.

**2.2.3.4 Spark arresting**

An axial cyclone is used as spark arrestor to protect the bags of the filter (installed downstream) from the risk of being damaged by hot particles conveyed by the fumes.

Depending on the requirements of the Client, the extracted material can be temporarily stored in a container or sent by a chain conveyor to the common conveyor and then, by the elevator, to the centralized dust silo.



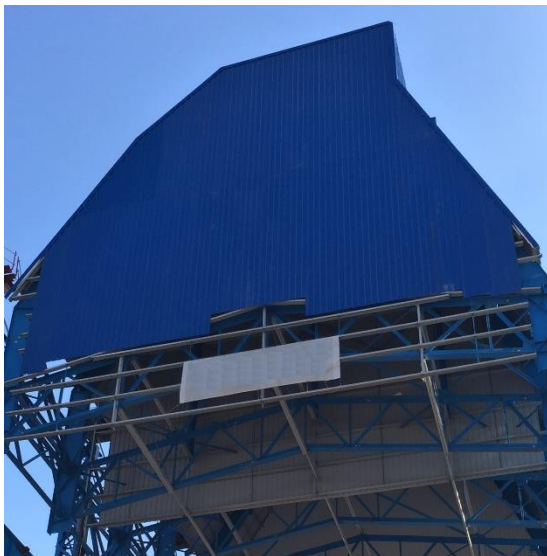
**Axial Cyclone**

**Section 2.2 / Design concept - Fume treatment plant****2.2.3 Process description****2.2.3.5 Secondary fumes sucked by the canopy hood**

The secondary fumes emitted by the EAF, mainly during tapping phases, are captured by the canopy hood installed above the EOT cranes on the roof of the building.

During the tapping phases, the flow dampers are completely open and provide the necessary melt shop ventilation ensuring the suction of the generated fumes.

The flow dampers of the canopy hood are positioned automatically to a pre-set value during the melting phase. This position is automatically adjusted by the computerized control system in order to allow the correct ventilation inside the building and the correct dilution air for primary fumes cooling.



Canopy Hood

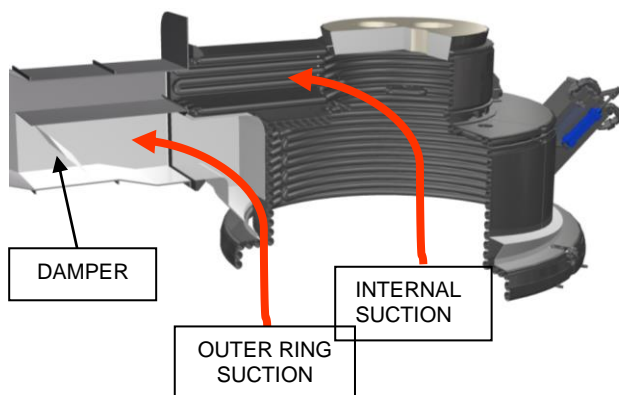


**Section 2.2 / Design concept - Fume treatment plant****2.2.3 Process description****2.2.3.6 Fumes sucked from the LF**

An independent suction line is provided for the Ladle Furnace.

The fumes are sucked from the LF roof. The duct has a booster fan with regulating speed that exhausts the fumes and, by compensating the pressure losses along the ducting, conveys them to the mixing point.

The fumes are then mixed with those collected by the canopy hood over the EAF and conveyed to the filter plant.



Ladle Furnace suction line

**Section 2.2 / Design concept - Fume treatment plant****2.2.3 Process description****2.2.3.7 Fume filtration**

DANIELI's pulse-jet bag filter technology combines efficient filtration of the fumes with low energy consumption.

The filter bags are cleaned by compressed air jets blown through electric diaphragm valves. For each bag, the air jet takes place inside a Venturi tube and therefore a strong induced gas draft is used for expanding the bag, with a sudden removal of its dust cake.

To maximize the cleaning efficiency, the bag compartment is automatically put in off-line mode during the cleaning operation. This procedure is used only during the EAF melting phase.



**BAG FILTER – Internal view**

The bag cleaning frequency is set by the automation system during the start-up of the plant, thus assuring effective filtration and low compressed air consumption in all operating conditions.

Upstream of the filter there is an emergency safety valve for dilution air intake. This valve opens automatically if the fume temperature should exceed the design temperature for the bags.

Normally, this safety valve is fully closed, even under the heaviest operating conditions.



**BAG FILTER – External view**

**2.2.3.8 Fume suction and exhaust**

The induced draft fans, installed downstream of the filter, suck the fumes from the whole circuit and deliver them to the centralized stack.

The main fans are located downstream of the filter and therefore they operate with filtered fumes, so high efficiency fan impellers can be used. This design reduces the maintenance requirements and the consumption of electric energy as well.



**Centralized stack**

**Section 2.2 / Design concept - Fume treatment plant****2.2.3 Process description****2.2.3.9 Dust collection and storage**

The coarser dust sucked from the ECS® outlet is intercepted in the settling chamber located nearby. The chamber has a maintenance door ensuring the access of a small front-end loader to remove the accumulated dust.

The dust discharged in the filter and cyclone is collected by chain conveyors under the hoppers and is sent to a storage silo by means of a chain elevator.

The dust is discharged from the silo through a screw conveyor to the transport truck.



**Dust collecting silo**

---

**2.2.3.10 Controls and regulating systems**

The variable operating conditions of the EAF requires the use of a regulation loop, to maintain a constant negative pressure inside the EAF. The pressure monitoring sensors, and the signal transducer, enable adjustment of the flow-rate, influencing the de-dusting efficiency of the plant.

Another regulation loop adjusts the operating condition of the circuits, in series with the pressure control loop, based on the temperature of the fumes.

The fume temperature control loop consists mainly of one logical circuit:

- > Fumes temperature control at the Bag-Filter inlet. The dilution air, required to keep the fumes temperature at the Bag-Filter inlet within design temperature, is sucked from the regulating damper of the canopy hood. An emergency set-point causes the opening of the second dilution air valve situated just upstream the Bag-Filter, to prevent damages to the bags.

Another emergency control loop is based on the monitoring of the cooling water temperature and pressure. The levels of temperature and pressure are monitored via the PLC.

Any of the above-mentioned set-points can be adjusted at any time, via the PLC, to allow for optimum performance of the de-dusting plant.

## 2.2.4 Design optimization

At the base of the Fume Treatment Plant engineering there is a careful and detailed study of each equipment.

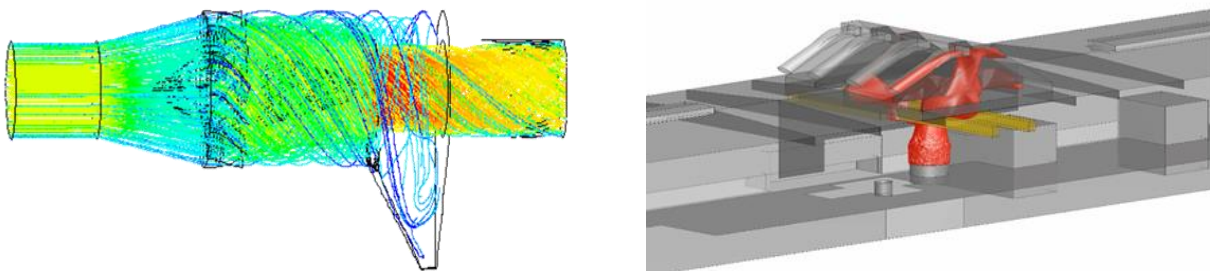
During the years, FTP machines have been modelled by means of dedicated CFD (Computational Fluid Dynamics) software in order to refine their design and optimize their efficiency and performances.



The CFD analysis involves the numerical solution of the governing partial differential equations that describe the transport of mass, momentum and energy of a fluid.

With the use of the CFD modelling it is possible to predict and analyze the fumes flow and to optimize the design of the equipment in order to maximize the efficiency of the entire system. Even though this type of study cannot be applied to all processes (for numerical reasons), its applicability is quite wide, allowing to predict multi-phase flow processes inside equipment and buildings as well.

One of the advantages of the CFD analysis is that it is based on the homothety principle, so it is more related to the shape of the equipment than to its size. For this reason, it is not necessary to repeat the analysis for each different size of the same equipment, but only if its geometry changes.



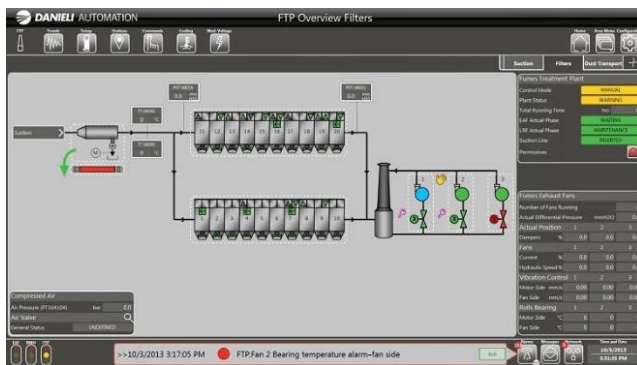
Everything starts from a 3D model of the specific equipment and with the definition of the boundary conditions. After that, the input data are entered in the model and, when everything is properly set up, the analysis is launched. As a result, the software shows the route of the fumes flow as well as possible problems and efficiency losses.

## 2.2.5 Process Automation

The fume treatment process is fully automated by means of a dedicated Programmable Logic Controller (PLC), which is interfaced with a PC used for data acquisition, recording and visualization.



Computerized process control



PC visualization of FTP operating data

---

## 2.2.6 Design data

---

### Fume Treatment Plant

Equipment	One Fume treatment plant common for EAF, canopy hood and auxiliary suction lines
Suction lines	ECS® outlet primary fumes Electric Arc Furnace secondary fumes from canopy hood EAF Tapping Hood Dynamic seal LF suction line
Filter design	Suction design pulse jet filter

#### 2.2.6.1 Operating conditions

##### Melting phase

EAF in melting phase (roof closed, primary fumes suction line open):

- > Suction from the ECS® outlet;
- > Suction from the canopy hood to provide melt shop ventilation and primary fumes cooling;
- > Suction from the Dynamic seal;
- > Suction from the LF in refining phase;

##### Tapping phase

EAF in tapping phase (roof closed or inclined EAF, primary fumes suction line closed):

- > Suction from the canopy hood;
- > Suction from EAF tapping hood;
- > Suction from the Dynamic seal;
- > Suction from the LF in refining phase;

## Section 2.2 / Design concept - Fume treatment plant

## 2.2.6 Design data

## 2.2.6.2 Process flow diagram

Height above sea level: 0 m

**EAF 39 ton - MELTING - PULSE JET FILTER**

Description	Point	Qn [Nm <sup>3</sup> /h]	T [°C]	Qe [m <sup>3</sup> /h]
ECS ® outlet	A	49.000	1.000	228.000
Water-cooled duct outlet	B	49.000	550	148.000
EAF Canopy hood duct	C	420.000	55	505.000
EAF Tapping hood duct	D	-	-	-
LF duct	E	20.000	150	31.000
Dynamic seal	F	35.000	60	43.000
Stack	G	524.000	105	726.000

**EAF 39 ton - TAPPING - PULSE JET FILTER**

Description	Point	Qn [Nm <sup>3</sup> /h]	T [°C]	Qe [m <sup>3</sup> /h]
ECS ® outlet	A	-	-	-
Water-cooled duct outlet	B	-	-	-
EAF Canopy hood duct	C	740.000	60	903.000
EAF Tapping hood duct	D	145.000	80	187.000
LF duct	E	20.000	150	31.000
Dynamic seal	F	17.500	60	21.000
Stack	G	922.500	65	1.142.000

**Note:** [Nm<sup>3</sup>/h] are referred to standard conditions of T = 0°C and P = 1 atm

## Section 3.2

# Mechanical Equipment - Fume Treatment Plant

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---

---

## 3.2.1 Primary fumes line

---

### 3.2.1.1 Water-cooled parts

#### **Location**

---

Between the ECS<sup>®</sup> conveyor and the primary single-wall duct.

#### **Duty**

---

To cool down the fumes and to convey exhaust EAF fumes from the ECS<sup>®</sup> through the settling chamber to the single-wall duct. To separate heavy and hot elements from the fumes flow.

#### **General Features**

---

The water-cooled ducts and panels are of tube-to-tube design and consists of flanged and bolted sections of appropriate length to be assembled or welded at erection.

The settling chamber is designed to enable the fall-down of the coarse particle (dust, light scrap). The side walls of the settling chamber are made by reinforced concrete lined with refractory material. The roof of the settling chamber are made by water-cooled panels.

The settling chamber is also fitted with a wide water-cooled service door. The door is hinged and sized to allow access to a small powered car (e.g. bobcat) for the removal of solid deposits.

Overpressure doors are located on the chamber in order to compensate the temporary overpressures in the system.

The water-cooled duct continues after the settling chamber to cool down the fume temperature according to process requirements.

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.1 Primary fumes line****Components**

- > One (1) water-cooled duct from the ECS® conveyor to the settling chamber;
- > One (1) set of settling chamber roof and service door in water-cooled panels;
- > One (1) water-cooled duct between the settling chamber and the primary simple wall duct;
- > Refractory materials for settling chamber (refractory for civil works, Customer supply);
- > Two (2) cooling water distribution manifolds for the water-cooled duct before the settling chamber (one (1) inlet and one (1) outlet TOP6 for the fixed part);
- > One (1) set of cooling water distribution manifolds for the water-cooled duct after the settling chamber (one (1) inlet and one (1) outlet TOP6 for all the duct sectors downstream the chamber).

The cooling water circuits will be series type; the settling chamber will have circuits in parallel, with multiple TOP6 for inlets and outlets.

**Characteristics of fixed duct**

Water cooled duct connecting the ECS® to the settling chamber internal equivalent diameter (approx.)	DN	<b>1.500</b>
Water cooled duct connecting the ECS® to the settling chamber length (approx.)	m	<b>10</b>
Settling chamber volume (approx.)	m <sup>3</sup>	<b>90</b>
Water cooled duct connecting the settling to the single-wall duct internal equivalent diameter (approx.)	DN	<b>1.400</b>
Water cooled duct connecting the settling to the single-wall duct length (approx.)	m	<b>20</b>
Settling chamber water-cooled door (approx.)	m x m	<b>2.5 x 2.5</b>
Water-cooled pipes material	<b>ASTM A106 or equivalent</b>	
Pipe wall thickness (for water-cooled parts)	<b>Schedule 40</b>	
Pipe wall diameter (for water-cooled parts)	<b>4 inches</b>	

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.1 Primary fumes line**

---

**3.2.1.2 Water-cooled parts supporting structures****Location**

---

On the water-cooled parts.

**Duty**

---

To support the water-cooled parts.

**General Features**

---

The supporting structure is made of painted, bolted and/or welded structural steel.

**Components**

---

- > One (1) set of supporting structures
- > One (1) set of saddle pads

**Characteristics**

---

Material

**Painted Carbon Steel**

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.1 Primary fumes line****3.2.1.3 Instrumentation for cooling water distribution piping****Location**

---

On the cooling water distribution piping for water-cooled parts.

**Duty**

---

To provide the monitoring and control of the cooling water parameters.

**General Features**

---

In the sections of the water-cooled duct from the ECS<sup>®</sup> outlet to the settling chamber and on the drain line of each circuit, a temperature transducer, a flow switch and a manual regulating valve are installed to calibrate the water circuit.

On the panels of the settling chamber and on the outlet line of each circuit, a temperature transducer, a flow switch and a manual regulating valve are installed to calibrate the water circuit. When the panels will be positioned very close with similar heat load, the instrumentation will be positioned on their common manifold.

In the sections of the water-cooled duct after the settling chamber and on the outlet line of each series of sections in parallel, a temperature transducer, a flow switch and a manual regulating valve are installed to calibrate the water circuit.

A flowmeter is provided to measure the entire water flowrate of the water-cooled duct. If for layout constraints it will be deemed to have difficult installation of one single flowmeter, several flowmeters will be installed.

**Components**

---

- > One (1) set of flow-switches;
- > One (1) flowmeter or set of flow-meters;
- > One (1) set of pressure indicators and temperature transducers (Pt100);
- > One (1) set of pressure transmitter and temperature transducers (Pt100) on general inlet and outlet circuit
- > One (1) set of automatic safety valves.

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.1 Primary fumes line****3.2.1.4 Single-wall ducts****Location**

Between the water cooled duct and the secondary single-wall duct

**Duty**

To convey exhaust EAF fumes to the secondary ducts.

**General Features**

The single-wall ducts consist of flanged and bolted sections of appropriate length to be assembled or welded at erection.

A dust discharging chute will be foreseen at the end of each extended horizontal duct portion, or in a suitable position nearby.

**Components**

- > One (1) set of single-wall ducts
- > One (1) set of inspection manholes
- > One (1) set of saddles
- > One (1) set of dust discharging chutes with manual discharge

**Characteristics**

Duct nominal diameter	mm	<b>1.400</b>
Duct total length	m	<b>According to the layout</b>
Material	<b>CORTEN A / B or equivalent (e.g. S355J0W - S355J0WP)</b>	

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.1 Primary fumes line**

---

**3.2.1.5 Single-wall ducts supporting structure****Location**

---

On the primary fumes single-wall ducts

**Duty**

---

To support the single-wall ducts

**General Features**

---

The supporting structure is made of painted, bolted and/or welded structural steel.

**Components**

---

- > One (1) set of supporting structures
- > One (1) set of saddle pads

**Characteristics**

---

Material

**Painted Carbon Steel**

---

## 3.2.2 Canopy hood

---

### **Location**

---

On the building, above the Electric Arc Furnace

### **Duty**

---

To collect the fumes escaping from the EAF during tapping phase

### **General Features**

---

The canopy hood is conceived as an extension of the building structure. For this reason, the canopy hood is considered as part of the building.

The canopy hood is designed to collect the secondary fumes developed during the furnace tapping phase and, even though in smaller amount, in the melting phase to provide the ventilation of the melt shop bay.

The canopy hood is made in structural steel covered by steel plates.

### **Components**

---

- > One (1) set of steel structures
- > One (1) set of steel plates
- > One (1) set of sealings

---

## 3.2.3 Secondary fumes line

---

### 3.2.3.1 Main single-wall ducts

#### Location

---

Between the secondary fumes canopy hood and the bag filter.

#### Duty

---

To convey canopy hood, EAF and auxiliary suction lines fumes (if any) to the filter.

#### General Features

---

The single-wall ducts consist of flanged and bolted sections of appropriate length to be assembled or welded at erection.

A dust discharging chute will be foreseen at the end of each extended horizontal duct portion, or in a suitable position nearby.

#### Components

---

- > One (1) set of single-wall ducts
- > One (1) set of inspection manholes
- > One (1) set of dust discharging chutes with manual discharge
- > One (1) set of saddles

#### Characteristics

---

Duct nominal diameter from canopy hood to mixing point	mm	<b>3.700</b>
Duct nominal diameter from mixing point to bag filter	mm	<b>4.300</b>
Duct total length	m	<b>According to the layout</b>
Material	<b>CORTEN A / B or equivalent (e.g. S355J0W - S355J0WP)</b>	

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.3 Secondary fumes line****3.2.3.2 Main single-wall ducts supporting structure****Location**

---

On the main single-wall ducts.

**Duty**

---

To support the single-wall ducts

**General Features**

---

The supporting structure is made of painted, bolted and/or welded structural steel.

**Components**

---

- > One (1) set of supporting structures
- > One (1) set of saddle pads

**Characteristics**

---

Material

**Painted Carbon Steel**

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.3 Secondary fumes line**

---

**3.2.3.3 EAF tapping hood****Location**

---

On the side part of the EAF EBT

**Duty**

---

Collect the fumes escaping the EAF during tapping.

**General Features**

---

The hood is designed to collect the secondary fumes developed during the furnace tapping phases. The hood consists in manifolds/suctions and ducts connected to the canopy secondary duct.

**Components**

---

- > One (1) hood made of welded steel plate
- > One (1) set of supporting structures
- > One (1) set of steel plates
- > One (1) set of sealings

**Characteristics**

---

Material

**CORTEN A / B or equivalent  
(e.g. S355J0W - S355J0WP)**

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.3 Secondary fumes line****3.2.3.4 EAF tapping hood fumes single-wall ducts****Location**

Between the EAF tapping hood and the secondary fumes duct.

**Duty**

To convey exhaust EAF tapping hood fumes to the secondary duct

**General Features**

The single-wall ducts consist of flanged and bolted sections of appropriate length to be assembled or welded at erection.

**Components**

- > One (1) set of single-wall ducts
- > One (1) set of inspection manholes
- > One (1) set of saddles

**Characteristics**

Duct nominal diameter	mm	<b>1.800</b>
Duct total length	m	<b>According to the layout</b>
Material	<b>CORTEN A / B or equivalent (e.g. S355J0W - S355J0WP)</b>	

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.3 Secondary fumes line**

---

**3.2.3.5 EAF tapping hood fumes single-wall ducts supporting structure****Location**

---

On the EAF Tapping Hood single-wall ducts.

**Duty**

---

To support the single-wall ducts

**General Features**

---

The supporting structure is made of painted, bolted and/or welded structural steel.

**Components**

---

- > One (1) set of supporting structures
- > One (1) set of saddle pads

**Characteristics**

---

Material

**Painted Carbon Steel**

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.3 Secondary fumes line****3.2.3.6 Ladle Furnace fumes single-wall ducts****Location**

Between the LF and the secondary fumes duct.

**Duty**

To convey exhaust LF fumes to the secondary duct

**General Features**

The single-wall ducts consist of flanged and bolted sections of appropriate length to be assembled or welded at erection.

**Components**

- > One (1) set of single-wall ducts
- > One (1) set of inspection manholes
- > One (1) set of saddles

**Characteristics**

Duct nominal diameter	mm	<b>700</b>
Duct total length	m	<b>According to the layout</b>
Material	<b>CORTEN A / B or equivalent (e.g. S355J0W - S355J0WP)</b>	

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.3 Secondary fumes line**

---

**3.2.3.7 Ladle furnace fumes single-wall ducts supporting structure****Location**

---

On the Ladle Furnace single-wall ducts

**Duty**

---

To support the single-wall ducts

**General Features**

---

The supporting structure is made of painted, bolted and/or welded structural steel.

**Components**

---

- > One (1) set of supporting structures
- > One (1) set of saddle pads

**Characteristics**

---

Material

**Painted Carbon Steel**

---

---

## 3.2.4 Spark arrester

---

### 3.2.4.1 Axial cyclone

---

#### Location

On the secondary fumes line, before the filter.

---

#### Duty

To separate the coarser dust and the ignited coal particles from the main stream.

---

#### General Features

The cyclone is designed to separate from the main stream both the coarser dust and the ignited coal particles.

The cyclone is made up of a cylindrical external shell equipped with an internal static rotor designed to give the fumes a rotational axial motion. Due to the centrifugal force, the heavier particles and the sparks are brought in contact with the outer shell and spent and stopped by friction.

The recovered particle matter is collected in the hopper located underneath the cyclone and then conveyed by means of a chain conveyor to the common chain elevator to the storage silos.

---

#### Components

- > One (1) static rotor;
- > One (1) external cylindrical shell;
- > One (1) dust collecting hopper.

---

#### Characteristics

Cyclone diameter (approx.)	mm	<b>6.500</b>
Cyclone length (approx.)	m	<b>12</b>
Material	<b>CORTEN A / B or equivalent (e.g. S355J0W - S355J0WP)</b>	

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.4 Spark arrester****3.2.4.2 Axial cyclone supporting structure****Location**

---

Under the cyclone

**Duty**

---

To support the cyclone

**General Features**

---

The supporting structure is made of painted, bolted and/or welded structural steel.

**Components**

---

- > One (1) set of supporting structures
- > One (1) set of saddle pads

**Characteristics**

---

Material

**Painted Carbon Steel**

---

---

## 3.2.5 Bag filter

---

### Location

---

Outside the meltshop.

### Duty

---

To filter the EAF exhaust fumes

### General Features

---

The filter includes the casing for compartments, bottom hoppers, the headers with bags, cages and cleaning system with electronic controlling system, the supporting structure and the roof made by corrugated steel sheets.

The filter unit is divided into several compartments, each comprising a pneumatic damper (16) at the outlet for off-line bags cleaning operation.

The filter casing (1) is connected underneath to a hopper (3), which gets narrower towards the dust removing system (2) for dust removal from the "dirty gas chamber" (4). This chamber is separated from the "clean gas chamber" by the plate (6) carrying the top of the bags. Partition walls divide the "dirty gas chamber" in compartments that may be isolated for inspection and maintenance purposes (i.e. bag changing).

The division of the casing into compartments is established on the basis of standard structural components. The support cages and injectors (7) support the bags (8) which are hooked, with their seal rings, between top partition and injectors. Together with a row of bags and quick release plugs, the injectors (9) form the compressed air distribution system. Valves and injectors are made of aluminium.

The injectors of a row of bags are fed with compressed air through pre-set diaphragm valve (10). Each compartment is fitted with a compressed air reservoir (11), which is provided with outlets towards the diaphragm valves. The time sequence of the valves is electronically controlled by the fume plant automation system, and automatically set according to the pressure loss of the compartments, measured by a differential pressure transmitter.

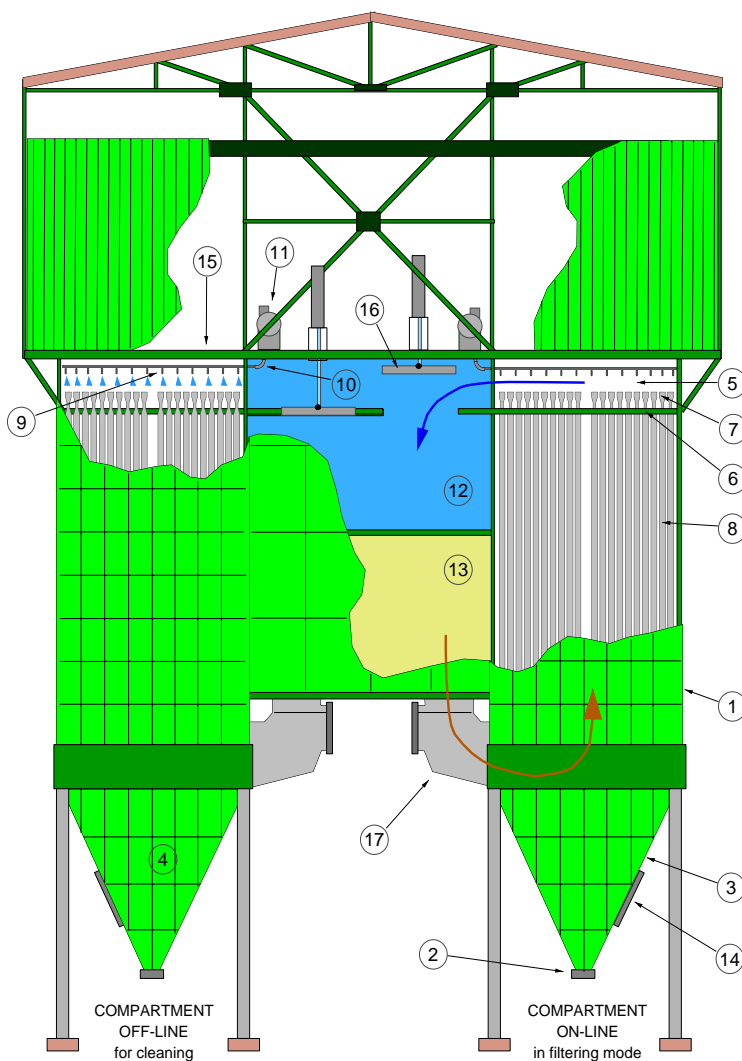
The clean gas chamber (5) is divided into further chambers; in this way, one compartment at a time might be excluded to consent the opening of the lid (15). The clean gas duct (12) is connected to each compartment and conveys the clean fumes to the stack.

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant**

**3.2.5 Bag filter**

**Other features**

- > The compartment lids are lifted by means of electrically operated hoists
- > Each compartment can be isolated independently for maintenance activities without interrupting normal production
- > Bag changing is performed from the top of the bag filter through the clean chamber. There is no need to enter the dirty chamber
- > The filter roof consents the maintenance of the equipment (in particular bag changing) even in case of bad weather conditions



**Legend**

- |     |  |
|-----|--|
| 1.  | Filter body  |
| 2.  | Dust removing system                               |
| 3.  | Filter hopper                                      |
| 4.  | Dirty chamber                                      |
| 5.  | Clean fume chamber                                 |
| 6.  | Bags carrying plate                                |
| 7.  | Injectors (Venturi nozzles)                        |
| 8.  | Bags   |
| 9.  | Compressed air injectors                           |
| 10. | Diaphragm valve                                    |
| 11. | Compressed air reservoir                           |
| 12. | Clean fume duct                                    |
| 13. | Dirty fume duct                                    |
| 14. | Inspection door                                    |
| 15. | Compartment opening lid                            |
| 16. | Compartment outlet damper (pneumatically operated) |
| 17. | Compartment inlet manual damper                    |

---

**Filter Operation**

---

Dirty gases enter the initial separating chamber (13). Due to the sudden expansion and consequent reduction of the stream velocity, the coarser particles are removed from the gas flow and drop into the hopper underneath. The filtering bags, supported by the cages, are located at the height of the top access opening.

During operation, the bags get stretched on the cages in a star like form due to the drop of pressure through the bag. The clean air stream flows then through the injector (7) into the clean gas chamber and then is released into the atmosphere by the fan.

---

**Bag Cleaning**

---

Bags are cleaned of particles of dust sticking to the outside by jets of compressed air. Cleaning is performed with the compartment "OFF-LINE", so that a higher degree of cleaning efficiency is achieved, even if the surface available for filtering is lower. An electronic device operates a solenoid valve (10) for a pulsating period, which can be set acting on the electronic cleaning system. During all this time, compressed air at 6 bar is fed to the injectors through the distribution pipe.

The whole flow of compressed air and clean gas is forced into the filtering bag (8) forming a counter-pressure suitable to clean the bag. The bag, which during filtering assumes the shape of a star in its cage, during the cleaning gets rapidly inflated downwards till it gets detached from its support. Owing to this sudden motion, the dust particles get detached and drop into the hopper underneath. As the diaphragm valve (10) closes, the clean bags return to their normal filtering shape.

All bags are cleaned according to a pre-set sequence.

The pulsating times and cleaning intervals can be adjusted according to requirements. Since only one row of bags (or several rows in several compartments) is cleaned during a fraction of second, the total area and the actual filtering area can be regarded as almost equal. Likewise, the air volume can be regarded as constant because of the extremely reduced quantity of compressed air used for cleaning.

Cleaning sequences vary according to the cleaning mode selected.

OFF-LINE cleaning:

- > the compartment is set OFF LINE by closing the pneumatically actuated damper at compartment outlet
- > air is injected in the rows in sequence, spaced by few seconds between two subsequent injections.
- > a suitable waiting time will be set during plant start-up to allow the correct settling in the hopper of the dust dislodged from the bags
- > opening of the compartment outlet damper, the compartment is then ON-LINE again for filtering.

The dust collected in the filter hoppers is evacuated by a dust removal system. A steel wire mesh protects this system against materials falls (fallen bags, tools, etc.) which could damage it.

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.5 Bag filter**

---

**3.2.5.1 Bag filter headers, casing and hoppers****Location**

---

At the filter

**Duty**

---

To provide the base for the filter casing and structure

**General Features**

---

The filter is made of welded panels, for casing and hoppers to collect the dust. On the headers are located the valves and accessories for filter operations.

**Components**

---

- > One (1) filter body complete with casing of compartments
- > One (1) set of hoppers
- > One (1) set of inlet/outlet manifolds
- > One (1) set of headers
- > One (1) set of inlet and outlet dampers (poppet valves or multivane dampers)
- > One (1) set of compressed air reservoirs.

**Characteristics**

---

Filter panels and hoppers material

**CORTEN A / B or equivalent  
(e.g. S355J0W - S355J0WP)**

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.5 Bag filter****3.2.5.2 Bag filter supporting structures****Location**

---

At the filter

**Duty**

---

To support the filter

**General Features**

---

The structure is made of welded structural steel.

**Components**

---

- > One (1) set of supporting structures at the bottom part of the filter to support the whole filter.
- > One (1) set of hoppers enclosure at the bottom part of the filter. The enclosure structure is made of welded structural steel.

**Characteristics**

---

Material

**Painted Carbon Steel**

---

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.5 Bag filter**

---

**3.2.5.3 Bag filter roof****Location**

---

On the filter

**Duty**

---

To provide cover of the filter for protection and maintenance

**General Features**

---

The roof enclosure structure is made of welded structural steel and corrugated steel sheets; the roof is equipped with electrically operated hoists

**Components**

---

- > One (1) corrugated steel sheet roof at the top of the filter to protect the filter, with supporting structures
- > Two (2) electrically operated hoists.

**Characteristics**

---

Material

**Painted Carbon Steel**

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.5 Bag filter****3.2.5.4 Bag filter components****Components**

- > One (1) set of commercial components, including pneumatic cylinders for outlet dampers, filter bags, bag cages (two pieces' type), electrovalves diaphragm type for bags cleaning, venturi injectors
- > One (1) set of compressed air piping distribution system complete with FR group up to the TOP6 positioned at the basis of a column of the filter.
- > One (1) electronic control system provided by fume plant automation

**Characteristics**

Filter fabric	<b>Needed felt polyester, thermally rolled</b>	
Fabric weight	gr/m <sup>2</sup>	<b>550</b>
Max fumes continuous operating temperature during melting phase	°C	<b>130</b>
Max fumes surge temperature	°C	<b>150</b>
Filtering surface during tapping phase (all compartment on-line, no bags cleaning)	m <sup>2</sup>	<b>12.303</b>
Filtering surface during melting phase (one compartment off-line for cleaning)	m <sup>2</sup>	<b>14.060</b>
Bag diameter	mm	<b>168</b>
Bag length	m	<b>9,25</b>
Bag cage type		<b>two pieces</b>

---

## 3.2.6 Dust conveying system

---

### Location

---

Between bag filter, cyclone and dust collecting silo

### Duty

---

To convey the dust separated by the bag filter, and the cyclone to the silo

### General Features

---

The dust separated by the filter is collected in the hoppers below and then removed by chain conveyors. The chain conveyors transport the dust to a common chain elevator that discharges the dust in a storage silo.

Separately a chain conveyor transports the dust collected by the cyclone via a chain conveyor to the common chain conveyor.

The chain links are casehardened to ensure an increased strength and resistance to wear.

The conveyor is fitted with tension terminals with precision hardened steel sprockets and wheels running in self-aligning ball bearings. "Zero-speed" switch is installed on the driven axle.

### Components

---

- > Two (2) chain conveyors under the hoppers of the filters, complete with gear motor, inspection door, "zero-speed" switch
- > One (1) chain conveyor for cyclone, complete with gear motor, inspection door, "zero-speed" switch
- > One (1) common horizontal chain conveyor complete with gearmotor and "zero-speed" switch
- > One (1) chain elevator complete with gear motor, inspection door, "zero-speed" switch, feeding the dust storage bin
- > One (1) fluidizing system installed at the silo conical hopper
- > One (1) screw conveyor for dust discharging from the silo to the truck
- > One (1) telescopic tube with level switch for discharging in a closed truck, with suction system connected to a filter compartment.

---

## 3.2.7 Single-wall ducts between filter, fans and stack

---

### Location

---

Between the filter, main fan(s) and the stack.

### Duty

---

To convey clean fumes from filter, through the fan, to the stack.

### General Features

---

The connecting manifolds made by rectangular or circular single-wall ducts, consist of flanged and bolted sections of appropriate length to be assembled or welded at erection.

### Components

---

- > One (1) connecting manifold between filter and stack plenum
- > One (1) set of connecting manifolds between fans and stack
- > One (1) set of structures, including one (1) set of main fans motor cover

### Characteristics

---

Number of manifolds between filters and plenum	<b>1</b>
Number of manifolds between fans and stack	<b>2</b>
Material	<b>CORTEN A / B or equivalent (e.g. S355J0W - S355J0WP)</b>

---

## 3.2.8 Dust storage silo

### 3.2.8.1 Dust storage silo body

#### Location

At the end of the fume plant

#### Duty

To store the dust separated by the cyclone and bag filter

#### General Features

The chain elevator discharges the dust in the storage bin. The storage bin is cylindrically shaped and is designed in order to facilitate the internal flow of dust and to prevent internal dust bridge formation.

The silo hopper is provided with a pneumatic fluidizing system to guarantee constant dust feeding to the discharging screw conveyor underneath.

Extraction of dust from the bin is performed by means of a screw conveyor below the lower cone of the bin itself.

#### Components

- > One (1) cylindrical body for collecting dust coming from the bag filter.

#### Characteristics

Dust storage silo volume (approx.)	m <sup>3</sup>	<b>90</b>
Material	<b>CORTEN A / B or equivalent (e.g. S355J0W - S355J0WP)</b>	

---

**3.2.8.2 Dust storage silo supporting structures****Location**

---

On the dust storage silo near the filter

**Duty**

---

To support the silo

**General Features**

---

The supporting structure is made of painted, bolted and/or welded structural steel.

The silo discharging area is covered and ventilated by means of a dedicated suction line connected to the main secondary duct line before Filter entrance. Sufficient openings are foreseen to ensure a proper air exchange rate.

**Components**

---

- > One (1) set of supporting structures
- > One (1) set of cladding

**Characteristics**

---

Material

**Painted Carbon Steel**

---

---

## 3.2.9 Stack

---

### Location

---

After the filter

### Duty

---

To exhaust clean air coming from the filter to the atmosphere

### General Features

---

The fume system stack is made of construction steel and is installed on a concrete plenum (part of civil works). The clean fume exiting the filter is conveyed, by the fans, into the stack via steel diffusers, which recover a part of the fan dynamic pressure, thus reducing energy consumption and enhancing suction efficiency.

The stack is supplied with inspection ports for gas-sampling.

### Components

---

- > One (1) stack body
- > One (1) set of inspection ports

### Characteristics

---

Stack diameter	m	<b>4.800</b>
Height of steel part (approx.)	m	<b>34</b>
Total height (comprising the concrete plenum, approx.)	m	<b>50</b>
Material	<b>CORTEN A / B or equivalent (e.g. S355J0W - S355J0WP)</b>	

---

---

## 3.2.10 Valves and dampers

---

### Location

On the fume suction ducts

---

### Duty

To provide control and shut-off of the different fumes suction lines during the various operating phases of the EAF

---

### General Features

The valves are installed on the different suction lines to regulate the fume flow-rates according to the operation requirements.

Each valve is complete with an electric actuator which, through a leverwork, transmits the motion to the blades. The blades are mounted on shafts supported by bearings.

The safety valve is equipped with pneumatic on/off actuator to have a quick response.

The HMI displays the actual position of the valves. For the on/off actuators, the valve position is detected by the limit switches installed on the valve shaft.

With the exception of the filter safety valve, the remaining dampers will not be air tight to avoid the zero flow rate effect of the plant. In particular, the canopy hood dampers will have a proper air passage to allow a minimum appropriate passage of flow rate.

---

### Components

One (1) set of regulating valves, each comprising:

- > one (1) valve body and vanes, complete with roller bearings, heat shield (wherever necessary)
- > one (1) electric actuator complete with limit switches, electrical position transmitter for regulating

One (1) filter safety valve, comprising:

- > one (1) valve body, complete with roller bearing
- > one (1) pneumatic actuator with limit switches

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant**

**3.2.10 Valves and dampers**

**Caratteristiche**

Filter safety valve:	quantity		<b>1</b>
	valve equivalent diameter	mm	<b>3.000</b>
	valve body and vane material	<b>CORTEN A / B or equivalent or Painted Carbon Steel</b>	
	actuator type	<b>pneumatic</b>	
Flow regulation damper on the primary fumes suction line:	quantity		<b>1</b>
	valve equivalent diameter	mm	<b>1.400</b>
	valve body and vane material	<b>CORTEN A / B or equivalent or Painted Carbon Steel</b>	
	actuator rotation	degrees	<b>90</b> <b>(1/4 of the whole rotation)</b>
Flow regulation dampers on the Canopy hood suction line:	quantity		<b>1</b>
	valve equivalent diameter	mm	<b>3.700</b>
	valve body and vane material	<b>CORTEN A / B or equivalent or Painted Carbon Steel</b>	
	actuator rotation	degrees	<b>90</b> <b>(1/4 of the whole rotation)</b>
Flow regulation dampers on the Ladle Furnace fumes suction line:	quantity		<b>1</b>
	valve equivalent diameter	mm	<b>700</b>
	valve body and vane material	<b>CORTEN A / B or equivalent or Painted Carbon Steel</b>	
	actuator rotation	degrees	<b>90</b> <b>(1/4 of the whole rotation)</b>
Flow regulation dampers on the Tapping Hood fumes suction line:	quantity		<b>1</b>
	valve equivalent diameter	mm	<b>1.800</b>
	valve body and vane material	<b>CORTEN A / B or equivalent or Painted Carbon Steel</b>	
	actuator rotation	degrees	<b>90</b> <b>(1/4 of the whole rotation)</b>

---

## 3.2.11 Fans

---

### 3.2.11.1 Main centrifugal fans

#### Type

---

Clean side ID centrifugal fan

#### Location

---

At the basis of the stack after the bag-filter

#### Duty

---

To exhaust the fumes through the bag-house

#### General Features

---

The exhaust fan is an Airfoil backward curved blades centrifugal fan located at the bag-filter outlet.

The impeller wheel is mounted on a forged steel shaft supported by roller bearings.

Two bearings supporting the shaft are fitted with two vibration probes to detect the horizontal vibration speed. These probes are directly connected with the power supply board of the motor and they stop the fan in case of any excessive vibrations.

The fan is equipped with an inlet damper.

The fan is coupled to an AC motor inverter driven.

#### Components

---

A main fan includes:

- > one (1) centrifugal fan body
- > one (1) impeller
- > one (1) inlet damper, complete with actuator and limit switches
- > one (1) inspection door
- > one (1) lining-up geared coupling between motor and fan
- > one (1) drain plug on the casing
- > one (1) vibration monitoring system

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.11 Fans**

- 
- > one (1) set of PT 100 on rolling bearings
  - > one (1) manual brake

**Characteristics**

---

Quantity	nr.	<b>2</b>
Maximum flow rate during tapping phase for each fan	m <sup>3</sup> /h	<b>571.000</b>
Fumes operating temperature during tapping phase	°C	<b>65</b>
Maximum flow rate during melting phase for each fan	m <sup>3</sup> /h	<b>363.000</b>
Fumes operating temperature during melting phase	°C	<b>105</b>
Electrical motor installed power (approx.). Final figure to be confirmed during detailed engineering.	kW	<b>1.100</b>

---

**Section 3.2 / Mechanical Equipment - Fume Treatment Plant****3.2.11 Fans****3.2.11.2 Ladle furnace booster fan****Location**

On the LF fume suction line

**Duty**

To provide additional pressure to the LF fumes suction line

**General Features**

The purpose of the booster fan is to provide full suction capacity (considering the pressure losses of the dedicated suction line), independently from the pressure in the main secondary duct leading to the filter plant.

The impeller wheel is mounted on a forged steel shaft supported by roller bearings.

Two bearings supporting the shaft are fitted with one vibration probe, motor side, to detect the horizontal vibration speed. This probe is directly connected to the PLC: the system gives an alarm in case of high vibrations and stops the motor power supply in case of excessive vibrations.

The booster fan is coupled to an AC motor inverter driven.

**Components**

A booster fan includes:

- > one (1) fan body;
- > one (1) impeller;
- > one (1) inlet damper with actuator;
- > one (1) vibration monitoring system;
- > one (1) set of PT 100 on rolling bearings.

**Characteristics**

Quantity	nr.	<b>1</b>
Maximum flow rate	m <sup>3</sup> /h	<b>31.000</b>
Fumes operating temperature	°C	<b>150</b>

---

## 3.2.12 Field instruments

---

### Location

---

In the ducts of the fume treatment plant

### Duty

---

To monitor and control the fumes

### General Features

---

The instruments are installed in different positions to control the system in all phases of meltshop steel production.

### Components

---

- > One (1) set of thermocouples
- > One (1) set of differential pressure transmitters
- > One (1) set of dust level limit switches for silo
- > One (1) dust stack level
- > One (1) flow meter at stack (composed by a multi pitot array of pipes with PDT)

**Note:** exact quantity will be defined during engineering phase.

---

## 3.2.13 Expansion joints

---

### **Location**

---

On each suction line and equipment, where necessary

### **Duty**

---

To compensate the ducts thermal dilatations and the structures movements

### **General Features**

---

The expansion joints are installed in different positions and provide the compensation of ducts thermal dilatations, structures movements and main equipment movements

### **Components**

---

One (1) set of multiple-layer fabric expansion joints for the different suction ducts, the filter inlet and outlet flange and in any other position, where necessary.

## 3.2.14 Anchor bolts and shims

---

### **Location**

---

On the base of FTP equipment

### **Duty**

---

To anchor the equipment to the reinforced concrete foundations

### **Components**

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- > One (1) set of anchor bolts
- > One (1) set of shims for FTP

## 3.2.15 Stairs, ladders and walkways

---

### **Location**

---

In different points of the Fumes Treatment Plant

### **Duty**

---

To provide access where necessary

### **General Features**

---

Access ladders, stairs and walkways are provided to reach the sliding sleeve actuator and all other actuators (e.g. for dampers), the regulating valves, the instruments, the manholes and the measuring ports of the system.

### **Components**

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- > One (1) set of stairs, ladders and walkways for Ducts
- > One (1) set of stairs, ladders and walkways for Bag Filter
- > One (1) set of stairs, ladders and walkways for Dust Storage Silo
- > One (1) set of stairs, ladders and walkways for Stack

## Appendix C Complaint Log

<b>Date &amp; Time Received</b>	<b>Date, Time &amp; Method of Acknowledgment</b>	<b>Complaint Name &amp; Contact Details</b>	<b>Nature of Complaint</b>	<b>Investigation Findings</b>	<b>Corrective Actions Identified</b>	<b>Date Corrective Actions Implemented</b>	<b>Date of Complaint Close-out Notice</b>



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